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ABSTRACT

The Chugach Conferences on the future of communication in Alaska are working conferences in which participants play as important a role as the speakers. The 1991 conference alternated public sessions with small-group discussion of communications issues such as rural circumstances, telephone policy, evolving communication technologies, distance education, privacy, and access to information. This proceedings record contains the following transcripts: (1) "A Progress Report: Communication Age Challenges and What's Happening Here" (Dean Gottehrer, Kay Brown, Ed Cushing, and Jason Ohler); (2) "Project Jukebox: 'We Are Digitizing Our Oral History Collection...And We're Including a Database'" (Steve Smith); (3) "Computer Conferencing: 'Let's Imagine You're at a Party with Isaac Asimov, Woody Allen and Bill Gates'" (Davis Foulger); (4) "'I think It's Critical That We Have a Real Presence in the Area of Telecommunications'" (Wayne Miller); (5) " The Old Familiar Landmarks Seem To Be Disappearing'" (Jerome Komisar); (6) "The Social and Political Contradictions of the Information Age" (Herbert Dordick); (7) "Broadcasting as a Tool for Social Change" (Brian Maracle); (8) "Center for Information Technology Reports: 'What We Don't Have Is a Record of Evaluating What We've Done'" (Larry Pearson, Rosemarie Alexander, and Douglas Franklin); (9) "Emerging Issues in Access and Dissemination of Government Information" (Ed Levine); (10) "Four Perspectives: The Past, Present and Future of Telecommunication in Rural Alaska" (Mark Foster, James Gore, Richard Dowling, and Willie Hensley); (11) "Putting Information Technologies to Work for Economic Development in Rural America" (Sherry Emery); (12) "The Alaska Telegraphics Project: First-Year Results and Second-Year Plans" (Alex Hills and Greg Moore); and (13) "The Conference Participants Report." A participant list is included. (KS)

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The Chugach Conference

Finding Our Way in the Communication Age

- Emerging Access Issues
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- Issues in Distance Education

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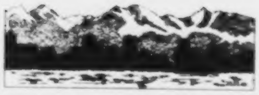

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Credits

Proceedings Design
Larry Pearson

Photography
Karen Roush

Transcription
Harriet Shaftel
Mary Hiller
Beth Kurtz
Kelly Jolley

Registration
Harriet Shaftel
Marilyn McGee

Audio/Visual
David Orping
Destyne Erickson

On the Cover

Augie Hiebert, foreground, Rep. Kay Brown and Dean Gottehrer, partially obscured, are caught by the camera during a discussion. The scene was also captured on the computer in the background, which displayed the output of a video camera.

The symbol is a silhouette of Alaska.

Introduction

This is the printed record of the third annual Chugach Conference on the Future of Communication in Alaska. The Conference, sponsored by the Center for Information Technology of the University of Alaska Anchorage, was held at the Hotel Captain Cook in Anchorage October 3 through 5, 1991.

The Chugach Conferences are working conferences, in which the participants play as important a role as the speakers. In 1991, public sessions alternated with small-group discussions of issues including rural communication, telephone policy, changing communication technologies, distance education, privacy and access to information.

An exhibit in the main conference meeting room illustrated the convergance of technologies that makes it appropriate for librarians, lawyers, broadcasters, newspaper editors, telephone and computer company executives, regulators and politicians to meet for a discussion of concerns they increasingly share.

A video camera connected to a computer permitted live video of conference activities to appear in a window on the computer monitor's color screen. As Conference Director Larry Pearson noted in his opening remarks, the equipment could easily have been used to capture still images and place them in print documents produced by the computer system. It was a system that blurred the boundaries among print, broadcast and computer media.

The objective of the Chugach Conferences is to make a difference in the development of Alaska's communication systems. Many of the technology- and policy-related issues addressed in this forum, however, are also important in other states — and other countries.

This was, as the proceedings should suggest, the most ambitious of the Chugach Conferences. A third day was added to the conference, and additional panel discussions contributed to the liveliness of the public sessions. This increased the challenge of producing a proceedings that could capture the atmosphere of the event.

Much of the conference planning was done by a steering committee composed of former State Representative H.A. "Red" Boucher; Barbara Gruenstein, Alascom administrator for contracts and real estate; Julianna Guy, president of Northern Television; Augie Hiebert, chairman and chief executive officer of Northern Television; John McKay, Anchorage attorney; Diane Kaplan, president of the Alaska Public Radio Network; Dr. Ronald Langley, former director of academic computing and institutional research at UAA; A.J. McClanahan, former editor and publisher of the Tundra Times; and Dr. Pearson, former director of UAA's Center for Information Technology and an associate professor in UAA's Department of Journalism and Public Communications. McKay and Kaplan were the conference moderators.

The Center for Information Technology was phased out in the first half of 1992, which affected several of the activities described in the Conference reports of Center staff members — as well as slowing production of the proceedings itself. Rosemarie Alexander's fieldwork was completed and she was able to provide some preliminary findings before leaving the Center. The Center was forced to abandon the WayPoint project described by Doug Franklin.

It proved necessary, too, to cancel the 1992 Chugach Conference. The steering committee hopes that funding can be found so that this will prove to be merely an intermission. We hope UAA will be able to again sponsor a Chugach Conference in 1993.

Correspondence regarding the proceedings and the Chugach Conferences should be directed to Professor Larry Pearson, Department of Journalism and Public Communicatons, University of Alaska Anchorage, 3211 Providence Drive, Anchorage, AK 99508. Phone: (907) 786-1037, FAX: (907) 786-6117, Bitnet: AFLLP@ALASKA.

A Progress Report:

Communication Age Challenges and

Dean Gottehrer,
assistant state ombudsman, has also worked as special assistant and legislative liaison for the commissioner of administration, was an aide to State Rep. Mike Davis specializing in telecommunications and public broadcasting and, for 12 years, taught journalism and mass communication law at the University of Alaska Fairbanks.

Kay Brown,
in her third term as a state representative, is a member of the Finance Committee and chair of its Department of Administration subcommittee. Between sessions she is an analyst for PlanGraphics Inc., a Kentucky-based computer consulting company. She is one of the authors of a recently published book, *Geographic Information Systems: A Guide to the Technology*.

DEAN GOTTEHRER: I'm going to try to stay away from things that I think other people are going to talk about — even though there's some areas that they're going to be touching that I'm very interested in — and try and take more of a shotgun approach to some of the things that I see happening in technology — and our ability to deal with knowledge and information — that I think are going to cause some problems and bring us some great benefits. When Kay Brown and I attended the White House Conference on Libraries and Information Services as two of the state's four delegates, I had occasion to speak to a number of people. One of the things I was saying to people was that out of all of this technology, what I'm looking for is to get all of the knowledge that humanity has created at my fingertips both at home and at the office, easily accessible, easily searched, and eventually in any language, although I'll settle for English first.

In my view information is power because it can lead to knowledge and that certainly is power in itself. I think we are headed in the direction where that will happen. It may take us quite a while to get there; there are going to be hardware problems along the way; there are going to be software problems; there are going to be people problems, and funding problems. But eventually the place that we now know as the library where you actually go and take out a book is going to become what is known on computer nets as a "virtual community." You'll be able to just dial in and get whatever information you want about whatever it is you seek in a way that's easily accessible to you at home or at work. One part of that that I see happening is something called NREN, the National Research and Educational Network. To me that is going to be the nervous system to help us communicate knowledge in the future.

When Kay and I were in Washington, the delegation met with Senator Stevens, and we talked about the potential problems there might be in Alaska if we got charged the telecommunications costs to bring this information to the state. And the senator said something that stuck in my mind since then, and that is that there should be the equivalent of postage stamp charges for telecommunications. In this day and age when everything goes up to a satellite, it doesn't make any difference whether you're in New York or in Fairbanks: It's got to all go up to that satellite and all come back down. And it isn't coming across land any longer; and so the reason for extensive telecommunications charges over long distances has pretty much disappeared. He said that he was going to be working to make sure that the postage stamp concept is applied to telecommunications charges.

I think part of NREN is going to be building the telephone network to handle even greater amounts of information. There are, of course, all kinds of policy implications on how it's built, what its structure is, who's going to have access to it, are there going to be charges for it, is it going to be free, and what's it going to carry. One of the forums that I get access to via the University of Alaska Computer Network has talked about what they call the "infosphere," which is the electronic access to information. I was thinking about this last night, and the thought came to me that life has become a "virtual community" for people who sign on to all these computer networks. You can pretty much work, play, learn, recreate — all out of your computer. You can get information on just about any subject you're interested in, including some that you may not want your kids to see. There are forums that contain information about sex, that'll bring you pornography, that have discussions about bestiality; or that have jokes or bring you other things about various kinds of computers, and you can get it right here in your home off

What's Happening Here

Jason Ohler

is a member of the school of education faculty and educational technology coordinator at the University of Alaska Juneau. He has developed and teaches courses on computer-mediated communication and computer communication for distance education. He also produces an on-line distance education "publication."

Ed Cushing

is Alaska general plant manager for PTI Communications. He has spent 15 of the last 20 years in the design, development and operation of telephone systems throughout rural Alaska. PTI Communications provides local telephone service to 74 communities in the Aleutians, Pribilof Islands, Southeastern and Interior Alaska.

John McKay,

Anchorage attorney who specializes in media law, was the moderator of this session.

Dean Gottehrer

the news feeds from the various computer forums.

What I think this has led us to is what I've decided to call "microscopic publishing." It used to be that freedom of press belonged to, in A.J. Liebling's words, "the man who owns one." He's a little bit behind the times in non-sexist language and so I'll amend that to say that freedom of the press these days belongs to the person on the computer. Because all you need to publish these days is a computer. If you want to make a hard copy, all you need is a printer of some sort; and if you're willing to deal with dot matrix, that's not much of a cost.

You can publish worldwide today from here if you find the right network to deal with the information you seek to disseminate. I've subscribed to more forums than I can count and it's gotten to the point where I'll come home at night and my wife — I'm now a computer widower I guess — has gotten really upset with me signing on and discovering that I've got some 100 messages to make my way through. And I think what's going on is eventually going to be a flood of information that people are going to have a heck of a time dealing with. There is some discussion on the networks about something called "know-bots," some way of filtering information so that you don't get swamped with everything people happen to say on a particular forum that you're signed onto.

For example, one of the forums I'm on is a discussion of computers and academic freedom and we've managed to attract some system operators who don't have in my view a real clear idea of what academic freedom's all about and are talking about looking at e-mail in people's files and determining whether or not mail that goes out onto a newsfeed is a good representation of whatever university's computer this comes on. And so there are times when I know that if I've gotten a message from John Jones — I had a name in mind but let him go nameless — I really don't want to see what he has to say. And so if I'm on V-News — for those of you who know the university computer, you can sign onto V-News on ACAD3 — I can set it up so that I'll never see a message from John Jones. Or I can set it up so that if there's a topic — a thread is going through the discussion — that I really don't care anything about, and I'm fed up with, I can decide not to see that one as well.

Eventually I think we will get much more sophisticated programming that will allow us to decide what we want to see, when we want to see it, what subjects we're interested

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in. And at some point I think we'll begin to go out into the Internet, which is a network of university and commercial computer systems and be able to search out information through what I would choose to call "know-bots", and tell it you want to know everything there is to know about access to information in state government and it will go out and find where the computers are that have files that have that information.

As we move along through this kind of technology, I think that there are problems that we're going to be seeing: Who's going to control the information that exists about you? Who will control what is charged for information held by government and held by the private sector? Will there be value-added kinds of opportunities for private companies to add value to government information, and charge for it? I am concerned about an information poverty — I think there's going to be a generation, at least, of people who are not computer-savvy, and will not be able to use computers and be able to search out this information. I see a couple of them in my own office — people who are just scared of computers, don't want to learn anything about it, and would like to go back to the old way.

'Who is responsible for the damage done by libel and invasion of privacy on a computer forum?'

In the brief amount of time I've got left, I just want to touch on what I see are some of the challenges to law that technology brings to us — legal changes that we're going to have to look at because of the nature of public forums and e-mail systems, and of access to public information. One of the major ones is the privacy issue. This computer forum I was talking about on academic freedom — who gets to look at your mail on a computer? If you're a state employee, is that a public record? When I was in the Department of Administration it was our belief that mail held in the Profs' mail system was public information, and that at some point we might well have to surrender that if somebody came in the door and wanted to see communication between commissioners.

Copyright issues. I was talking with Steve Smith earlier today, and some of the problems that he's running into don't have to do with the hardware — you can solve hardware problems — and don't have to do with the software, because you can solve some of those problems. They're people problems having to do with who's going to own what information and decide how you can use it.

Libel and invasion of privacy issues. When every computer is a publisher, who is responsible for the damage done by libel and the invasion of privacy on a computer forum? I haven't seen that question addressed by a court yet. There are all kinds of possible answers to that. The computer owner, for example the university in the instance of UACN; the computer operator, that is, the system operator who makes that computer run, and in some instances, where people are looking at mail before it goes out, those people could be held responsible because they are exercising some judgment as to what mail can go out onto a network. And then just the individual computer user. There are all kinds of models about how to handle this, none of which really covers what goes on in computer systems. Unfortunately, I think this is likely to be resolved in the courts if legislation is not passed. I see legislation in the area being extremely difficult, at least at the moment, because constituents don't, and probably won't, agree on how to handle it.

Finally, just two concerns out of my career past. One is plagiarism. I think technology opens up the opportunity for plagiarism to a far greater extent than ever before, and makes it far more difficult to detect. I have on occasion flunked students for plagiarism. I'm glad in one sense that I'm no longer in the classroom because detecting it, I think, now would be extremely difficult if not impossible. Finally, out of journalism, the ability for computer-altering of photographs in art has become so great that we can put anybody anywhere and make it so that it's extremely difficult for you to detect that that photograph has been altered.

The extent of sophistication on this one — when we discussed it at a national meeting about five years ago — was AP was saying "nobody would ever do that." Well, people are doing it: *National Geographic* has done it on its cover. So we need to begin to bring our ethics and morality up to what our technology is allowing us to do. What I've tried to do, as I said when I started out, was a scatter-gun approach — I think I've covered a wide range of issues, and I'll pass it on to some people who I think will be a bit more specific now.

KAY BROWN: I'm also going to just touch on a number of different issues that I've been working on and bring you up to date on some of the things that we discussed at the conference last year. Just following up on Dean's discussion, I agree with the list of issues he cited that will require a response in the law. I don't know if you've had a chance to catch this magazine, but if you haven't I really recommend it to you — the September issue of *Scientific American*. It's devoted to communications, computers and networks and it has a very interesting discussion of that topic as well as many other topics in the field of networking. It's really an excellent resource and very topical.

I was the author of the re-write of the state's open records statute that incorporated electronic information, and at the last conference I made a presentation on this in some detail. Just to briefly update you on what's happened: The law took effect in September of 1990. We still do not have regulations in place that will implement it, although there are a lot of activities going on in the agencies and some days I feel like I've become the information ombudsman, because I'm all the time having people phone in asking for interpretations of what does this mean, and how much should they be charged, and so forth.

But I am glad to report that the Department of Administration has put someone now in charge of developing regulations and they're expected to have a draft out by the end of November that will provide the overview structure for how the agencies will be pricing and charging for electronic information. One of the agencies that's been most active in developing on-line electronic products and services which is one of the concepts of what was established in the bill is the Department of Natural Resources. They have started an on-line service for their land administration system, and have a lot of clients in private industry that are now signing up at the cost of $50 a month or $500 a year for on-line access.

'If we don't get top management involved, we never really ask those fundamental questions.'

Some of the other problem areas I would point to would be the Division of Motor Vehicles where there have been a number of complaints initiated with respect to the charge they're making for their computerized file of everyone's driver's license information — they're charging in the neighborhood of $30,000 for this electronic product that they feel is justified. I'm still working with them attempting to understand how they reached that conclusion. As I would read it, they should be charging much less than that because their information is in the form that the agency has it. If somebody wants information in the form that the agency has it, the price should just be the incremental cost of producing that copy; not the development cost that went into that. So we're still having discussions on that.

One of the problems of not having the Telecommunications Information Council meet and function on a regular basis is that we do not at this time have a forum for resolution of disputes of this type. The legislation provided that the TIC, as it's called, would arbitrate those disputes. I think there are many good reasons why we need a Telecommunications Information Council in state government. There are so many issues that require coordination. We worry about islands of information — we're not going to get closer to solving the problem if we don't have a way we can talk to each other and work these things out. So I continue to urge the Department of Administration and the Governor's Office to activate this group and make it a functional group. There is resistance to that, and Rep. Boucher and I continue to strategize on how we can sell that idea.

I heard a very interesting presentation by a gentleman who had been involved in implementing technology at Ford Motor Company, and he re-emphasized the importance of top management getting involved in information decisions. These are not things, in my opinion, that can be driven by technicians from the lower level. It's just not workable. Technicians and people down in the lower levels of the organization can't come up with very good plans of how to implement the overall goal. But if you let them drive the decisions, you miss what is the greatest opportunity of introducing technology into organizations. And that is to re-think how we do things. To re-think the process itself, and to look for ways both to do things more efficiently and to deliver better service to the public. And we know there are many examples of how technology is being used in organizations to do that.

But if we don't get top management involved, we never really ask those fundamental questions: Why is my organization here? What are we trying to accomplish? How is technology going to aid us? Instead we're driven by the hardware decision, and everybody gets focused on the hardware when we really should be looking at the functionality of it — the data — that's what in my opinion we need to focus on. We're solving those technological problems: which platform is it on and so forth — and the connections between them — but the data is going to be timely and universal and the real value will be in how the data is structured and how much care and thought you put into it.

I think that the TIC is the way that we should approach this problem in state government. I hope that with the new opportunity we now have to have new leadership in that department that we'll see some change in direction there. One thing the department has initiated is a new group called the Information Systems Project Review Committee. This group is going to have very broad powers — in fact I have some legal questions about how they can assign to this group functions that are assigned elsewhere to others in the statute. They're going to be reviewing all proposed expenditures by state agencies for computer projects as well as the implementation plans. They're going to deal with charge-back issues; they're going to review charges and adjudicate appeals regarding charges for electronic records, and establish procedures to review statewide information systems and telecommunications plans.

I wonder how they're going to be reviewing plans that really don't exist yet in state government for the most part, or if they do they're existing on a department-by-department basis. But we still lack that overall vision for where we're headed with our state telecommunications and information systems. Rep. Boucher, among others, has been pushing for years to have this accomplished. And I realize there are many reasons that it doesn't get accomplished, but I still feel that it's a fundamental task that we have to undertake, and that we just haven't quite gotten there.

Another bright spot, from my perspective, is the

Geographic Information Systems Task Force that's being led by Dianne Lyles of the Department of Natural Resources. They are working to try to put together a statewide plan or a vision of how we're going to proceed with our geographic information so that as we collect it, and as new acquisitions are made, they will all fit into a big picture.

For example, in the recent census data that came out you may be aware that the Department of Labor set up yet another geographic information system within state government without an effort to coordinate that system with the other systems that already exist. I thought that that was a mistake at the time, but I didn't want to hold up the capability of the people who were doing that task and re-drawing the election districts from having the technology.

'How do we get maximum usefulness out of this data that we're spending millions of public dollars to collect and maintain?'

Unfortunately, the lieutenant governor's office took over the project — took it out of the Department of Labor and into his office — and then failed to produce readable, usable maps. I don't know if any of you were involved with this, and have seen the maps, but they absolutely look like they were drawn on the back of a napkin.

This was really distressing to me after we'd spent, I forget the exact number, but it was close to $100,000, to buy them a new system, and they just didn't have the expertise to get it up and running in a timely way so that it could have a good effect on the process that we are now going through to re-draw our election districts across the state. I understand that system has been shifted back to the Department of Labor, but still the overall problem remains of how do we get maximum usefulness out of this data that we're spending millions of public dollars to collect and maintain without having a plan to make them be integratable and useful in a maximum number of formats for a maximum number of agencies.

I want to turn now to another area that I'm spending a lot of time and energy on, and that's education technology. I've gotten really excited about the political climate and the possibilities for change, in part because of what's going on at the federal level. As you're probably aware, there is a national push from the president on down — Lamarr Alexander was on MacNeil-Lehrer last evening along with a number of others — discussing this subject. What they hope to achieve is a quantum leap in improving the quality of education in our country. I think education technology is absolutely central, fundamental, to making this happen. We know it will work; we know in the classrooms where education technology is available, and is being used, that there are great leaps in the ability of students to learn. I think that's in part because we're harnessing the power of the computer to improve teacher effectiveness so that they can have time to focus on teaching. And using the power of the computer to track every student's individual progress. I also think that using educational technology is one of the most cost-effective ways we can effectively lower class size.

I'll just quickly wrap this up here and say this gentleman, Terrill Bell, who was Secretary of Education in the Nixon years, has just come out with his book *How to Shape Up Our Nation's Schools.* And he says it's all very well and good to have this long-range vision, but what we need is a plan to implement immediately because we can't wait nine years to invent this whole new generation of American schools. What can we do today, and how can we get there? He makes a very convincing case for education technology, and presents a very detailed plan of how to achieve it. So if you're interested in this area, I urge you to get this book. It's a self-published book. I'd be happy to share with you who to call and write to for a copy.

I am at the state level promoting two bills, HB203 and 204, that would provide the resources to give us a massive infusion of education technology in the schools of Alaska. After searching for a number of ways of how we could pay for this — which I believe is going to cost roughly $100 million to put a ratio of one computer to every three students, as well as one for every teacher, in the state-of-the-art multi-media environment as well as providing the networking capability, the modem, the telephone, and the other elements that are necessary to plug our schools into what is going on in the rest of the world — we're going for a statewide bond issue that will be on the ballot in 1992. I'm working with a number of people in the education community to try to get consensus on how we can make this happen, and how the plan could actually be implemented, and to build support for a public vote. So I was really encouraged to see the library technology bonds pass here in Anchorage. I think that's an excellent sign that the public does in fact appreciate the necessity of libraries and information and of bringing our schools into the 20th century. So, those are some issues — there's a lot more that I could say but my time is up.

JASON OHLER: I think probably the most important thing that I can tell you is that I'm an English teacher — or I try to be an English teacher. I showed up at the alternative high school in Juneau in 1983, knowing something about computers, and suddenly I wasn't an English teacher any more. I was a computer teacher, because I basically knew how to turn it on, and how to do something with it other than program it...

I was gold. Suddenly I was swept away to the university; I had an office. It was just amazing — the confusion was outstanding. And it gave me an opportunity to do all sorts of things I'd never had an opportunity to do.

So since then I've been working with teachers. And as we're all really familiar with media lately — about how awful education is, whether you agree with that or not, there's a lot of media that suggests that that's true. I'm going to tell you what I think teachers want in information technology. And I think they want a few things: 1) They want access, and they don't have access in this state. What do I mean by access? I mean, if I'm going to plug my laptop computer into a telephone system from Adak and go online, I'm going to quickly exhaust all my savings. We simply do not have the kind of equity of access that we need purely from a financial point of view if what we want are the kinds of systems that we want our teachers to use.

'You stick an adult in front of a computer, particularly a teacher, and the first thing they do is go ashen.'

I think they also want training, and in my educational technology programs, a master's in educational technology teaches teachers how to use computers, telecommunications, video, so on and so forth. And they are starved for this kind of training. I mean, it's great to sit a computer down in front of somebody — and if you're a kid, you'll be doing something with it within 10 minutes — but you stick an adult in front of a computer, particularly a teacher, and the first thing they do is they go ashen. And then they look around for the nearest 10-year-old. "Hey, Bob, how do you turn it on?"

One of the biggest lessons that teachers are learning in educational technology, one of the most fundamental shifts in the classroom, is that teachers have to turn to students, people half their age, to ask them how to use this stuff. And suddenly, the teacher is no longer the fount of information at the head of the classroom, but is a partner basically for students as they learn. And I've watched that over the past decade, and it has been an absolutely fascinating progression.

I think the third thing teachers want is information about information. That is, let's say hypothetically I have a black box in my room. Out of that black box comes a phone link, a data link, a cable TV link. And now I have access to all of the information I could possibly want to augment science or math or whatever it is I'm going to teach. I haven't the faintest idea what's there. How do I possibly find the time, first of all, to find the information that will tell me what's there, and second of all, to do some sort of quality check to find out whether the kind of stuff that's there is any good.

I think what teachers want is something, probably hard copy, in their metal mailbox in the office that says, "Every Wednesday from 9 to 10 there's a science program on that's been highly rated, and I think you'll probably want to look at that." Because otherwise having access to all that information is really pretty useless.

I think we as a society need to present educational technology and information technology in a way that says to them, "It's okay not to know this stuff, but it really is time for you to get to know this stuff." A lot of these issues are not a matter of technology; I think a lot of them are really a matter of new thinking. We really need new thinking. We need new partnerships between business and our telecommunications services and the State Board of Education, and teachers, and so on and so forth, that says, "I know it costs $2.50 for a phone call, but it doesn't have to be that way." And I know, I have people from the FCC tell me, "Well, you can't change that." And I look at them and I say, "Why not?" This silence sort of falls. It's really pretty much a cultural thing — I realize those costs are there. But either through state funding, or reorganization of our priorities or something, that kind of access has to be there. Otherwise, talking about it really amounts to nothing.

Just to give you a very quick overview of what we're teaching teachers. We're teaching teachers who want an intro to educational computing in the fall semester, and intro to using audio-visual equipment in the fall semester also, and intro to educational telecommunications. That was something that 10 years ago took one evening. I now have an entire 16 weeks on it — I could go for 50 weeks on it. As others have mentioned, the amount of useful, interesting information is astounding.

We teach them how to use what we call "tool software." There's not a single programming course in my master's degree. Programming basically at this point for teachers is useless. The programs you can buy these days are so good that we literally had to wait until the hypermedia kinds of applications we're getting now with HyperCard, and those kinds of things, to make it worth their while to sit down and write something, program something of their own that was useful to them.

Then we move into policy in the spring semester — it's educational technology planning, it's advanced telecommunications in distance education, and it's my favorite course, which is my technology-bashing course called "the social impact of technology" — because no sooner do I turn them into technophiles, than I have to sort of pull them away and make sure that they understand that there's no such thing as technology apart from its culture. And that every time we do this, every time we make this kind of connection, we make a dis-connection over here. And it's really, really important to get the connections and dis-connections in front of you and weigh those. And it may just turn out that in that class over there, they really don't need more computers. What they really need is a teacher who understands cooperative learning techniques, or something like that. Those are the kinds of things that you have to deal with.

So the three things I think teachers really want are training, they want access, and they want information about the information that's out there. And basically they need the okay from us, as a society, to say, "It's okay to put your time into that; we're going to tell you that it's okay to put your time into that by paying you, maybe to take a day off here and there to go to training, and so on and so forth." And that, when you're complaining next time about the status of education, or you're listening to someone complain, or you're wondering why a son, or a son of a friend, doesn't know the kind of information skills that he or she needs to know, it's because we collectively as a culture, as a society, have not put that, have not advanced that as a priority. And I think you do that by putting it at the forefront of education.

'We have in this state already in place, in switching, the best network in the world.'

ED CUSHING: Jason and Kay and Dean have all touched on something in their respective talks, even though one's speaking about education, one's speaking about government, and one's speaking from the perspective of the user. They've all touched on something that's critical at this conference, that's critical for us to go about our daily business, and that's the network.

As this conference goes forward the next two-and-a-half days, people will talk about cross-cultural communication; they'll talk about rural communication in Alaska; they'll talk about government; and they'll talk about education. That's all well and good, but we should never lose sight of the fact that, lacking an affordable network, none of what we talk about will be possible. We need access to an affordable network. So with that, I think I have some good news. I'll attempt to limit my remarks to PTI Communications, and what kind of health our piece of the network is in. And though I will limit my remarks to PTI Communications, I think they're fairly representative of what the local telephone industry looks like around the rest of the state today. I'd like to start by just sharing some background about PTI Communications.

We serve about 60,000 customers in 74 communities around the state. Most of the communities we serve in the state are extremely rural — 62 as a matter of fact are extremely rural. Twenty-six of the original communities that we serve came out of some predecessor companies that we acquired: Juneau-Douglas Telephone, Sitka Telephone, Ft. Wainwright Telephone, and Glacier State Telephone Company. The remaining 48 communities that we serve have all been added to the system in the last eight to nine years. Restated, eight to nine years ago, 48 of the communities had no local telephone service. None. And that's fairly remarkable when you compare Alaska to the Lower 48, who have been enjoying local telephone service for some years.

I also want to point out that when you talk about local telephone service, you're essentially talking about two things: in our world, you're talking about the local network, that is the switching and distribution networks that serve the community; and then we talk about our administrative networks, how we go about ensuring that the system functions. As far as the local network goes, in 60-some-odd of the communities that we serve today, the digital switches that provide the service are absolutely state-of-the-art, bar none, the best technology available in the world. Within the next two years the remaining 14 communities will have their digital switches upgraded, and be in much the same state. That being the case, it is rather remarkable to look at that map and realize that we do lead the nation, we do lead the world, when it comes to ensuring in this state that the best possible technology is in place at the local level.

Literally every service that is available in New York City, or in Seattle, for local telecommunication services, is available, or can be made available in any one of these communities. The second thing I would offer, as far as local distribution network goes: It's important to understand in the past typically the distribution networks have been put in place with copper cables, somewhat limiting bandwith, but as we've been marching forward, starting with larger communities like Juneau, Sitka and Kenai, we have been putting fiber-optic facilities in place, and this last year we put fiber optic in the community of St. George. The nice thing is that we didn't do it because there was a large capacity demand; we did it because it was an affordable thing to do. Slowly, over time, these very high capacity, very complex, very sophisticated networks are coming into place, not necessarily because there's a large demand, but because it's the most affordable, most economic way to make the system work. So in short, on the local side, we have in this state already in place, in switching, the best network in the world.

On the distribution side, we are evolving one of the best distribution networks in the world. The third thing I'd offer, that's kind of interesting, is that over the last three years we've been starting to use wireless technologies. We've helped to establish cellular systems in Juneau and North Pole. We've started using a system called UltraPhone, also known as BETRS, or Basic Electronic Telecommunications Radio Service. It's a digital, private-line telephone system — wireless. We have systems in place in Sitka, in Kodiak, in Homer, in North Pole, in Tenneke Springs, in Pelikan, in Juneau, and half a dozen other places around this state.

What we've been able to do with these systems is bring people on to the network that have never been served before, typically people that are living in houses on islands, people living around lakes, people far from the community where conventional wire service just wasn't possible or affordable. About 1-1/2% of our total customer base today is served by some form of digital private line, wireless service, and we just see that continuing to grow and grow. And it's quite possible over time, if the federal government releases the spectrum, we may see by far the largest percentage of the customers in the nation served by wireless technologies, rather than wire.

But in the meantime this is a system that's evolving and, once again, Alaska led the nation in putting this kind of technology into play. Just a quick snapshot of the system: It's important to keep in mind, to never forget, that Alaska does lead the nation when it comes to ensuring that the latest and greatest state-of-the-art equipment's in place and being utilized. This is a sidenote — talking about the administrative portion of what we call our network — again, not being much different than any other local company in the state, we have systems in place that enable us to trouble-shoot a switch — it doesn't matter if it's in Egegik or St. Paul. We can trouble-shoot it from Anchorage or from Juneau. We can effect a repair from a thousand miles away, or from a country away if need be. We have statewide alarm systems. Today, if a switch is bad in Egegik, we know it within seconds. It doesn't matter what time of day it is. If we receive a call from you from False Pass, and you say, "I need a phone today installed at Marty Smith's house," literally, at the touch of a button, the dial tone would be there before you get back to Marty Smith's house. So just in general, this is an overview, this is a very healthy, robust, complex, sophisticated, actually leading-the-world type of system that's in place.

Technically, in this state, I don't see us having a problem looking down the road one year, five years, 10 years. Technically, it's just very simple — we do lead the world. I think where your problems are going to come to bear, are simply going to be affordability of the access. The risk that we run in this state and in the world is creating a class of users who can afford to use the network and a class of people who can't. Postage stamp rates may be the answer, if we get there.

The question is one I think of convergence. Will we get there before the demand, or will the demand arrive first, causing all sorts of social problems in the interim? Taking a look at the Chugach Conference for a moment, I did attend the first conference, and we spent some time in our work session talking about the need to first form a vision. Because if you have a vision, you have a target; then you can plan to reach whatever that vision might be. Lacking a vision, typically you'll spend a lot of time talking, but perhaps not a lot of time getting to where you need to be.

So if I can close at the risk of being repetitive. We have a world-class network in this state. We've led the nation for at least 20 years, and will continue to do so. What we need to be talking about is a vision. Where do we go from here?

Some of those things we've already touched on, some things have been done. I think that distance education is definitely going to be one of the the hot topics as we go forward the next couple of years. If there was ever a state in this nation that needed distance education, this appears to be the place. Those kinds of things you'll find well and good, but they don't do you any good if you don't have an affordable network.

So the Center for Information Technology, if you want to do something effective, if you want to work towards a goal that will keep us whole, keep us ahead of the world, to me the challenge would be formulating a vision, taking actions that ensure that we always have an affordable network, that we always have this super communications highway that goes into every community in the state, regardless of the size of the community.

JOHN McKAY: Thank you very much. Thank you, all the panelists. There's a lot of ideas to follow up on. Kay?

BROWN: One thing I'd just like to mention as a current issue is just the status of the Center for Information Technology itself. If you saw this morning's *Anchorage Times* you know the University is planning to phase this organization out of existence. As we've listened to the wide variety — there's just so many different topics that are out there — that need coordination, that need this kind of exchange that we're going to have over the next couple of days, I think it's a real sad situation, and a big lost opportunity for us that we will abort this effort before it has a chance to reach its potential. So I hope as the conference proceeds we can think about that — how important is it to maintain this organization as a forum and a focal point for coordination in so many areas — distance education being one example where we have almost a right hand and a left hand doesn't-know-what-each-other-is-doing situation. There is so much going on out there. I think that that is an important role that this Center can play.

McKAY: Any questions?

HOWARD WEAVER: I have one that I guess I would address to Kay, but I would be happy to hear from anybody. You alluded to the situation where — perhaps to put a little plainer face on it — it seems that some of us who were involved in issues that Commissioner Millett Keller either didn't appreciate or value, or in my opinion understand — some of the access issues, and some of the computerization issues that were facing the state and citizens, needed to be broadened out. How does one develop some momentum at the highest level in the state? You and Rep. Boucher have been out there hacking and slashing for a while. Do you have a sense of how we can communicate that to our other representatives, or to the administration — to people who just don't seem to get it?

BROWN: Well, that is in fact a challenge. The people in this room I think are probably here because they are interested in some aspect. And I think we all approach it from our unique experience and our connection, and the more I learn about it, I realize that it is very complicated. But I think we are almost reaching critical mass now in society, as technology advances, as the information age becomes a reality, it comes upon us, and we see more and more shifts to an electronic world and an electronic environment. Education technology is something that many parents, many teachers, many educators can get personally involved in and see a result that matters to them.

I think it's just like selling any other idea. You have to convince people why does this matter to me, how is it going to impact my life, and why should I care? My feeling is that there is a lot of grassroots interest and support, although we do have the generational gap and the training problems of people who are becoming exposed to it and didn't grow up with it. I think if you think about putting this technology into our schools so that our kids become very familiar with it, we address a couple of problems: economic competitiveness in the United States, and how we compete in the rest of the world in what's certainly going to be a global information environment.

There's also the problem that a couple of the speakers alluded to — the poverty problem, the haves and the have nots. How are we going to ensure that everybody can be a part of this network and this information age? I think that the schools and the libraries are at a minimum the place to start to ensure that that access occurs, to ensure that the person, no matter how poor — just as though that in addition to the fact he can walk into the library today and read the book on the shelf — that tomorrow he should walk into the library and have access to that window of electronic communication, even if he doesn't have any computer at home.

I think many people in society will have computers in their homes and the issue becomes: What is the communication medium to the home? Is it just copper; is it fiber? What range of communication services are we going to provide to the home? And as that expands more, that will really give it a boost as people develop the services to meet the demand that arguably isn't there yet. You know, it's a chicken and egg — which came first? But I'm focusing on education technology, because I think it has the potential for broad public appeal.

McKAY: Just to follow up — and maybe some of the other panelists would like to jump in — Kay's model in which she described what needs to happen is you have to involve top management. You have to get them involved for things to happen. And yet the thing that the other speakers seem to refer to is the generational gap, whatever that is. Jason Ohler says that when the teachers come in, they're ashen-faced; they sit back. There's no reason to think that the other people who are policy-makers who say, "Stenographic shorthand is the way to go; don't put a computer on my desk," should not be asked. Is it a realistic model, or do we need to recognize that's not working? Or not about to work in a realistic timeframe and go about it in some other way, instead of pretending that there's going to be a top-management-down approach? Is that realistic and, if not, is there an alternative?

OHLER: Well, I'll tell you what I asked the ashen-faced crew: If you don't have a computer, and life seems to be okay, what do you want your kid to learn? And they just sort of nod, because there isn't one of them that doesn't want their children to be schooled in the tools of their culture, not one. So if you can't get to them, you can always get to them through the kids.

HERBERT DORDICK: Telephone penetration, household penetration in the United States is about 94%. That is, if you ask the question, "Do you have a telephone in your home?" it's about 94%. "Do you have access to a telephone in the building?" it's about 97%. Alaska ranks pretty low — about 86 to 87%. Is Alaska participating in the Lifeline and Link-Up-America services?

CUSHING: It's my understanding that the Alaska Telephone Association has been promoting a Lifeline bill in Juneau for at least the last two if not three sessions and has not been successful in seeing that bill passed. Basically what it means is a bill that would ensure that all of the ratepayers in the state would help fund the monthly rate. That is, all of you would pay a little bit more for those who can't pay as much as the rest of us.

AUDIENCE MEMBER: Many of us participate in the Universal Service Fund which the FCC administrates through the National Exchange Carriers Association. And that participation helps us to keep rates affordable. In rural Alaska the rates that we charge are $19 a month for local service, and you're looking at St. Lawrence Island, or Kodiak, and some of those remote areas. What allows us to do that is having access to the Universal Service Fund.

DORDICK: Is that $19 a Lifeline service or...?

AUDIENCE MEMBER: Well, the Lifeline program is a different program that some of us were very concerned about because of the administrative costs involved in dealing with that program. There are two programs: the Lifeline Program and the Universal Service Fund program. The Universal Service Fund program is nearer and dearer to our heart because it's what makes our system work. The Lifeline program is another program that some states are experimenting with, some successfully, some not so successfully. I think that we can do just fine with the Universal Service fund.

DORDICK: I want to point out that those states that have participated in the Lifeline link-ups have significantly raised their communication levels.

CUSHING: I'd like to make just one quick comment in reference to Herb's question about Alaska telephone penetration. Alaska's presented some problems that are very unique when compared to the Lower 48, the first of which, of course, is one of distance and expense. My family pioneered the first rural telephone system in this state, starting with rural villages in Southeast Alaska, and that was just 20 some years ago — not very long ago as compared to telecommunications in the Lower 48. So it's a different can of worms. In many cases it's not a meaningful comparison.

DORDICK: There are similar cases. There are other rural states — for example, New Mexico — which also suffer from such long distances. One of the problems they've run into is the federal-state controversy over who will wire them up. The Louisiana decision at the United States Court of Appeals essentially denied the opportunity for the operators in Louisiana to alter the rate base rather insignificantly to extend service to parts of that state that did not yet have access — they weren't even wired. The FCC argued that they ought to be allowed to do that. The court ruled that the state had the authority to make that judgment. So you have this conflict. Yet in New Mexico they're doing exactly what you're doing — they're going out with BETRS; companies are coming in, and the telephone company in New Mexico fights that and says, "They don't have the franchise." And the state telecommunications authority said, "You've had one for the last 60 years. Why haven't you used it?" And they just go ahead and do it. So there are similar problems.

Jim Ruppert, left, and Bryan Biesanz, center foreground, both of the Department of Administration, listen to a speaker.

McKAY: I'd also note that this is obviously the tip of the iceberg. And I think Steve and some of the others who have been involved in, for example, legislation and the feud about competition that's been going on the last couple of years have a lot of knowledge to share. And there is — for those of you who are still looking at the total makeup of the program — there's a panel Saturday morning at 9 o'clock on rural telephone policy. I'm sure it will allow you the opportunity to get more heavily into some of these issues then, too. Anybody have more follow-up in another area, or continue there?

LARRY WIGET: Just a comment. Reading, writing and arithmetic seems to be, and still is, very important. But as we get into using computers more and more, keyboarding skills become very important (inaudible). And the other is there used to be a problem with teachers, a threat of computers taking their job away. And the question is, is that starting to dissolve, starting to go away?

OHLER: My perspective is that, of course, keyboarding is something that should be taught. And there are all kinds of studies out there about when to start them, when you're supposed to offer them. And I don't have those at my fingertips. But a companion comment on that: The jury is out on a lot of educational computing, but the jury is definitely in if only on this — on using word processing. The fact is that kids who don't want to write will write using their computers for obvious reasons. It's just mechanically much, much easier to edit. In terms of computers taking teachers' jobs, I think, I haven't heard that in a while. I know that's a reality in the minds of some. What I encounter more often is, "Another teacher who knows how to use the computer will take my job." And I think that more and more they are looking at that, in order to compete, it's a skill that they have to have.

GOTTEHRER: If I may make a comment in that direction. One of the lessons that we learned in educational television in Colombia was that you just couldn't put kids in front of a TV set and expect them to learn. You had to have a teacher there to motivate them to want to watch the program and to follow-up afterwards. And I would suspect the same thing is true with computers. You can't put kids in front of a machine, whether it be a TV set or a computer, and expect them to learn everything you want them to learn just by plunking them down. You need a guide, you need somebody there to help them along, and that's what a teacher does.

WEAVER: I have a question. And maybe somebody in the audience can also respond to it. It seems to me as we describe the infrastructure, the network and what happens,

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that that is really encouraging. It seems to me part of what has to happen in order for a consensus to build on this is for applications not only to happen but become widely known. I wonder whether we could do a sort of inventory, or maybe some of the panel would know, of places in the state where that is being taken advantage of, where things are maybe innovative or out of the ordinary. And then just an addendum to that, I wonder whether that wouldn't be a useful function for the Center for Information Technology — to be a clearinghouse so that we could all find out that in such and such a place they're doing this, and in such and such a place they're doing that — it might not then strengthen the Center's position.

CUSHING: Just as a coincidence, yesterday morning I received a letter from a community school that is geographically located so that it supports almost half a dozen other smaller schools in surrounding communities, but again no connection by road. Their interest, of course, is in distance education. They're looking for information as to how the network is put together, and also what we might have to offer in terms of helping them down the road toward putting in a network, or by educating over remote distances. So the need is out there. I'm not willing to share where that is or what we might do, simply because communications is becoming very competitive. I would just comment that the need is there. And it's like anything else, once the demand materializes, people will find a way to meet the demand. If we haven't learned anything else in this society, it should be that it's very difficult to create the demand for something that people don't want. You have to be very careful about forcing society. If society isn't ready, there's not much point in you trying to give them anything.

This builds on an earlier question that you asked. I see our whole computer-in-education thing today as being just a problem of convergence. Our technology is up here — it's advanced so rapidly — but our users are kind of down here. And I think just over the last two years we've seen the first college graduates who have grown up with computer technology. I think that being the case we're going to start seeing the user very rapidly catch up. But I think that the key lies in what Kay's been talking about, and that is starting now in the schools at a very young age, educating kids on computers. That's the key to the whole puzzle. Our six-year-old daughter took her first computer appreciation course when she was six years old. That's the good news. The bad news is it wasn't here, it was in Montana. But that's the kind of thing we need to be focusing on.

GOTTEHRER: I think another part of what Howard (Weaver) is talking about though is what I would characterize as the difference about computers and the way people handle computers. You know how to use many other devices that have been technologically advanced in our society. If you don't know how to use them, you can generally find a pretty decent manual that tells you, for the most part, assuming that it wasn't a machine that was made in Japan, with a manual written by speakers of Japanese. But you can generally find out how to do it, and find out where it exists. For those of you who are on the Internet or on Bitnet forums, you'll see an awful lot of discussion going on about what exists out there, where is it, how do you find it, how do you know what it has to offer you, and whether or not you can even get to use it.

I came to computers having to finally learn that I couldn't go to the library to figure out how to do it. If I was going to do it fast, I needed to ask somebody else. And so that same kind of, "Ask the young kid," to me translated to, "Find a guru" — somebody preferably who could speak plain English, and explain to me how to do something that I was having a problem doing. We don't have all those manuals listing where the programs are, and what kinds of things are available, and I think that's because our technology has advanced beyond our social ability to deal with it.

I think we're going to catch up. But I'm not sure exactly how that's going to shape up. For example, on one of the forums I'm on there's been a continuing debate on whether or not there should be a national directory of user IDs, and how you would ever keep that up, I don't know.

OHLER: We all agree that children should be taught how to use computers, and that's preceded by teaching teachers how to use computers — that's how that works, that's the progression. Teachers know how, and they walk into the classroom, and they're ready to go. Having said that, I understand that it's basically been children teaching teachers, and that does work to a certain extent. And it's very interesting to watch, but if you want to do it efficiently, then basically reverse that.

BROWN: I think a lot of people, as I've talked to people about this idea, get really focused on the hardware. And the hardware seems to drive the whole process. You know we say, "Let's teach them computers," when what we really want to teach people is how to find information, how to communicate in this environment. So the computer is really just the tool, and you need to back up down the chain and look at what it is we want to accomplish, how it is going to work, and then make the software decision. There is a lot of software out there — I'm just becoming exposed to the range of what's available — and I think it's quite impressive in terms of what it does.

I guess you can debate, are we teaching the right curriculum in math, are we teaching the right thing, but there's no question that computers engage kids in a way that a traditional chalkboard does not. Part of what's missing in education is giving people the desire to learn and to function effectively in society in the future, and that's really what we want to do. So there's a lot more to it, and I completely agree that the training, the access and the other pieces to the package absolutely must be there or the thing will fail. It will not work to just stick boxes in classrooms and expect people to do anything with it.

In fact that's something people bring up and they say, "We've already spent all this money, and we have all this hardware sitting all over rural Alaska and no one is using it." So my response is, we should make more investment in training, more investment in networks, and more investment in software. And we also probably need to make more investment in hardware, too. But that is just not what is by itself going to do it.

McKAY: Does your $100 million bond proposition . . . How does that break down in terms of hardware, software, training? What is it you're proposing?

BROWN: Well, I would say it is still in development because we've been having discussions about what are appropriate items to be bonded, and it's not entirely clear to me at this juncture whether software is in fact a bondable item. But I would say the rough working model I had is about $40 million hardware, $40 million software and $20 million training and associated costs. Generally how I planned to package that is to try to go for $80 million as the bond issue, assuming we can talk to lawyers into letting us bond for software, and carry the other $20 million spaced out over a couple of years as a fiscal note in the bill to be paid with general funds.

For those of you who have been following this, you'll recall that what I started out with was general funds, just a straight general fund grant as the source of payment. Then I went to the Science and Technology fund and said, "Let's use that money." Well, that set off a firestorm of controversy because that fund has a lot of supporters, and I quickly said that's not going to be a productive avenue. So I switched to a general obligation bond, and I got the Finance Committee to adopt a committee substitute that is still in the committee — we've not moved it out. So if you go to your LIO, your legislative information office, and ask for a copy, you'll get the Science and Technology version, which is the last printed copy.

I am actively working and trying to convince people that a bond issue is the most appropriate way that we can get a large amount of money, and just let the public decide. That's how I feel about it — let's see if they're ready if we have a plan. Now part of what I'm trying to do is marshall the resources for this whole package as we've described it, but you can't implement it from the outside.

I hope very much to engage this administration, and Commissioner Covey of the state Department of Education, and others in developing a plan to implement this, because it's got to be something that is overall managed by the Department of Administration, but some of the details are fleshed out in HB203 as to exactly how the program would work. But it requires a vision from inside the system.

DIANE KAPLAN: A few weeks ago Jacqueline Tetpon and I from APRN participated in a consultation process with the Smithsonian Institution and the Museum of the American Indian which is being built, and what they were interested in doing is bringing in people from out here and around the country to figure out how to make the resources of the museum available to people who'd never get to Washington, D.C., mainly through telecommunications. And the thing that came up over and over again was the willingness, ability of Native Americans, in particular rural people out in the field, to really access it, even if the hardware is there and the software and everything else. Just by accident earlier today I read something that Larry Merculief from St. Paul Island in the Pribilofs wrote. He was writing a critique of a radio series he did, and one of them was on using computers to teach Native kids their language. It's just a couple of paragraphs, and I think it very much relates to this, and I'd just like to get the panelists' response.

> "The use of computers to teach one's language is a method to reach young Native people who have been indoctrinated into the mechanistic linear structure of the dominant society. It is this mechanistic linear type of approach, though, that has proven to be unwittingly destructive to indigenous cultures. Some elders question whether or not use of this modern technology ultimately contributes to the destruction of traditional values.
>
> "This is a valid concern because computer is involved in a system which contrasts with the circular world view of most indigenous cultures. Computers evolved along the straight line of improvements over older technologies, that which is considered older technology is discarded because it is regarded as primitive and no longer useful. More energy and materials are often needed to replace that which is discarded. By contrast the cyclical world view of indigenous peoples does not discard technologies quickly, does not increase energy consumption without careful consideration, and tries to eliminate wasteful processes."

I think it's kind of interesting. I just wonder if the panel would comment about how do you adapt or interest people who may be very suspicious of using a technology just because it's seen very often as really damaging to the cultures you might be striving to save or enhance.

GOTTEHRER: I know it may be heresy to say this in this room, but I think one of the worst things that we ever did was to put RATNET out into the Bush. I think putting white television out into Native rural communities has probably done more to destroy the culture than anything else. So the question that I would ask Larry Merculief is — if you don't want to use computers at all, how would you continue to maintain the existence of the culture and its language? If you're willing to use computers, how could you use them in a way that wouldn't destroy their culture, and I would look to Larry Merculief and others in the community to tell us how they would like to use it rather than for us to tell them.

OHLER: The answer to me is real simple: to help an indigenous culture use the technology when they ask for it, and only when they ask for it. I had the great pleasure of having seven predominantly Native communities come to me when I was in Vancouver, B.C., and say, "We have graduated one high school student in 10 years, and we feel that (face to face) the predominantly white school system has totally failed us. What we want you, Jason, to do is to design for us an electronic school that will hop over essentially white culture so that we can teach each other." I look at that and I say that's a very valid use of the technology, primarily because they came to me. That made me feel real good about it.

I had the great pleasure of working on the Indian Nation's adverse task force report, and Paul Berg and I wrote the chapter on using educational technology for Native populations, and over and over we found the same thing: Those indigenous cultures that look at the technology and see that they can adapt it for their own purposes are going to do a good job of it and ought to be using it. There's no question that the medium is the message. Inherent in your computer technology is the sum total of white culture, it's all right there. At some point you accept that irony, and you use it for your own benefit, or you reject it. And that's their decision to make.

BROWN: I see information technology making possible viable economic development in rural areas. The opportunities that will exist, exist today, and will become even greater in the future for telecommuting, opening up new worlds of possibilities that do not exist and haven't existed in the past. So when Native kids grow up and have skills or knowledge that they can use from their home or their small business in rural Alaska using modern communication technology, we've given them the opportunity to participate if they choose to, and to live in their village if they choose to stay at home, as opposed to move to an urban center.

I just attended at the Western Legislative Conference a discussion about how rural America is dying, and the West is dying, and two very different viewpoints were presented. But I tend to believe that it is the reality that we are becoming the global village and the information age offers a lot of new opportunities and people in rural areas can find ways to plug in from where they are, sell the piece of knowledge that they have, and use the communication networks to do that.

CUSHING: Just a quick sort of side comment. If you compare computer technology to simple telephone or telecommunication, just in 20 years we've seen the telephone go from becoming a sort of social nicety to an absolute economic necessity. Whether it's urban or rural today, you'd have a very difficult time surviving without the telephone. We are in the middle of seeing computers go through exactly the same transition. Less than 20 years ago computers were something nice to have, but not necessarily critical. Tomorrow you will not be able to survive economically, whether you're in Egegik, St. Paul, Sitka, Juneau or Seattle, unless you have a telecommunications line connected to a computer. If somehow, some way, you found a method to survive without that tool, then that's wonderful. But that would be very, very much the exception rather than the rule.

STEVE SMITH: I'm Steve Smith with the University of Alaska in Fairbanks. I'd like to echo some of the things that you all have had to say in response to that paragraph. I think you have to be careful of the top down forcing technology onto folks. It has to be very much bottom up, especially where people can see that it's going to be useful for them, that it's simply a tool that can be used. You have to get away from this mystique of the technology. One of the authors in the magazine that Kay mentioned, Alan Kay, said that one of the problems we have at schools now is that if you liken computers to pencils as a tool, suppose we took all the pencils and put them in one room and we locked the room up and said, "If you want to use the pencil come and ask for the key to the room because we keep it all locked up." I think we have to spread this stuff out.

I was involved in the '70s when we did some of the first teleconferencing and satellite projects in the state, and then I had questions in my mind because we would jet around — I was in the production area then — jet around the state, stop in villages and shoot with all this high-tech gear, and then we'd fly back out of the community, and I knew a lot of people were saying, "What in the hell are they doing with all this gear?" We were imposing the technology on them.

As opposed to now, about a year ago, a Native elder from an interior village came — we have a rural honors institute at the University of Alaska Fairbanks in the summer — and he was there to teach one of the courses. And he came over to ask me what I would suggest to him would be the best camcorder to buy because he was going to take the money he made in that rural honors institute and buy a camcorder which he would then use to record himself and some of the other elders in the community, so that those tapes would be there for the kids to view later on. I think those are the kinds of things that folks can see this is going to help us, and we just sit back there and facilitate that rather than impose upon people what the technology is going to give them.

McKAY: We have about a dozen different interesting directions we could go in, and we have time for probably one or two more. So this is not the time to sit on your favorite topic at this point. Who would like to suggest the direction that we should start?

ROSEMARIE ALEXANDER: I'm Rosemarie Alexander with the Center for Information Technology, and I just came back from three weeks in three Native villages in the NANA region of the Northwest Arctic Borough. Those schools are all very nicely outfitted with computers which the state bought them a number of years ago. They also have all white teachers with the exception of one school which has one Native person teaching. Those computers are all sitting there with ashen-faced white teachers who have locked the rooms and don't know how to use them who say, "Gosh, we've got all this stuff but we really don't know what to do with it."

The one major school that we were in that was using their little Macintoshes is upgrading them next year; they're using them a lot and enjoying them. The kids I saw all sat there with pleasure and were getting a lot out of it. They're learning how to write in a class that before television was introduced — according to the teacher who's been there a number of years — had a tremendous problem with language. And now between television and computers they're all speaking better English and writing better. I think a lot of it has to do, as Kay and Jason mentioned, with the actual use of the computers in the schools. And that's just kind of a reality check — I just got back from there.

WEAVER: Is the issue of access a federal issue? We talk about these people plugging into one of these virtual communities. Where's that question going to be resolved?

BROWN: You're saying giving people in remote areas the ability to access the telecommunication number...

WEAVER: No, to afford access, and whether that's a federal question or...

CUSHING: It depends on whether it's an intrastate or an interstate connection. If it's an intrastate connection, within-a-state connection, then ultimately it falls under the purview of the APUC, and there it's a question of answering this question: This is the pot of money it cost to build the local and the long-distance network. How much of this pot of money and the resulting charges should go against the long lines of long distance versus the local?

McKAY: You're pointing out the fact that obviously when this person called you, there's some competitive factors here. Everybody's trying to compete and live in this market, and you're providing a service and you need a reasonable rate of return to allow you to continue. It there an inherent tension between what we keep hearing about — we need affordable access, and the providers of service who say for competitive reasons or otherwise we need a reasonable rate of return — is there a logjam there that's contributing to this? And along those lines, a couple of you have mentioned, Jason has mentioned, that maybe what we need for on-line service is a state subsidy, or a federal subsidy, or whatever it might be. Is a subsidy the answer to this? Is it the only answer?

CUSHING: It's not the only answer. I'm sure there are at least one or two people in this room, although they may be wrong, who would probably propose to you that the answer is that the state should build its own network, and run and operate its own network. And our argument obviously would be that that could never be cheaper, although the costs would certainly be different.

OHLER: I just want to go so far as to say that every distance education effort I know of that has failed, has not failed because of pedagogical reasons. God knows there are plenty of failed distance ed projects out there in which people just didn't know what they were doing. But those in which people did know what they were doing have failed because of transmission costs, every time.

McKAY: And is the answer to that subsidies, or is there another answer?

OHLER: I think there's a whole host of answers. I think it's re-prioritizing. Rep. Brown and I were talking at one point about putting into that bill a million dollars for an 800 number to dial up (Brown: it's in there) the University of Alaska computer network. I really think if you put the goal on the table — access — and you bring the right people to the table, it may take a day, it may take a weekend, but you'll walk away with some sort of solution.

McKAY: Very quickly, the last comment.

ED LEVINE: I would suggest that the transmission costs and the connectivity costs will become a small part of the problem. Anybody who is trying to actually get somewhere where functionality is provided and to learn something, to do something, what you find out is that if you need to get access to a database, or an application or something, what you find is that these costs are much greater for the average user than the single cost of connectivity.

Project Jukebox:

'We are digitizing our oral history collection . . . and we're including a database'

Steve Smith is project manager and coordinates extended campus services at the University of Alaska Fairbanks Rasmuson Library. He has been responsible for design, installation and maintenance of network access to CD-ROM databases. He has an M.A. in communications from the University of Hawaii Manoa and is completing a Ph.D. in information science from Nova University.

I really have what I think is the best job in the world — I work at the Rasmuson Library at the University of Alaska Fairbanks — because my title is "project manager" and basically this means that I'm kind of the in-house consultant on technology. So every time new toys come in, I'm the guy that gets to play with them, and I'm involved with all the new projects there. We're making a real concerted effort at Rasmuson Library to open up access to things, and part of what I'm going to show you today, Project Jukebox, is one of the ways we're doing that.

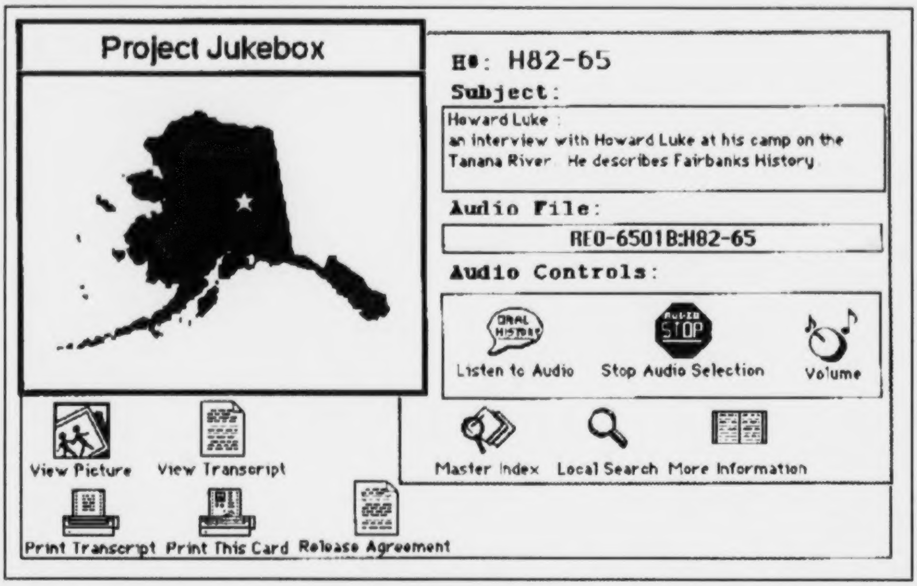
You're really going to see two things that are happening simultaneously, and I think it's echoed in most of the things I've read; and one is we're moving into multi-media — there certainly is a big push on for that — and that means we're getting away from just the text which is kind of an archaic and foreign language. A lot of the programmers I work with, I say, "You guys are working on dead languages." They have to learn all those arcane commands, and all those little abbreviations that nobody else can understand. But we're moving into audio and video and the full spectrum of things. I started out in broadcasting; I got out of that because I thought it was too narrow a thing, and I got into computers and networks and I discover now that all of my broadcast and video and audio background is coming back into play again, because we're really getting into that. The second thing is, with this multi-media playing, we're networking and making access available to all these things.

We have a number of special collections at Rasmuson. One of the collections we have that's a special collection is an oral history collection — about 6,000 hours of tape right now, and it's growing as we continue to collect audiotapes. It also includes some videotapes — that's one of the specialized collections we have.

We have a problem with that, as we have a problem with all of our specialized collections. The problem is two-fold: one is preservation; the second is access to that material. A lot of the recordings we have are just on this type of tape, and any of you who have worked in this know that if these things just sit on the shelf, and you don't do anything to them, they're going to degrade. They're going to lose the quality from that magnetic recording. Most of the stuff we do now that's new is on cassette. We haven't quite made it to the digital-audiotape , but we're moving in that direction. But even those — if this stuff just sits on the shelf it's going to have problems. And with 6,000 hours, it becomes very labor intensive for us to go back and rotate the tapes and run them through a machine on any kind of a regular basis. Not to mention the storage that this starts to take up. And we face this problem of storage, of paper documents — we have an extensive photograph collection, several hundred thousand photographs in our archives — how do we store that stuff, how do we make access to it?

The access problem exists right now. As you walk into our archives, it looks very nice, very traditional, everyone speaks in hushed tones and you sit down and you look through this index — we finally put the index on a computer — but it's hard to really understand what it's saying. And you search through and you might find a recording you want, and maybe if you're lucky a small abstract that tells what's on that recording. Our oral history collection covers every area of Alaska history, the past and the current. We have all the major politicians in the state, and the minor politicians in the state, and the average person in the street, in the cities and in the villages, the Native leaders. Any area you want to go into, we have coverage of that on oral tapes — some of them have been recorded by us; that's what we're doing now — but many of them are recordings that have been made elsewhere, that have been made on radio stations, that are coverage of something, some event — we collect those tapes and archive them. So there's a lot of interesting and important information there — cultural, political, economic, social, you name it.

But anyway, the person comes in, they may find the tape they want, they think, they find several tapes they want, and so they give a little slip of paper to a staff person, and that staff person goes back and finds the tape. And of course we can't let people listen to the original recording. Suppose they hit the wrong button on the tape recorder; they'd erase it. So we have to make a copy of that, and you can't make duplicate copies and just keep them on hand — there's 6,000 hours of recording. That would more than double our storage space, and just the time to do that is too expensive. So the staff member goes and finds the tape and goes and makes a copy, and if there's not too much else going on, you may get the copy the same day; you may not get it for several days. If that person were on vacation, or sick, or the right staff member's not there, you may have to wait longer.



H#: H82-65

Subject:

Howard Luke :
an interview with Howard Luke at his camp on the Tanana River. He describes Fairbanks History.

Audio File:

REO-6501B:H82-65

Audio Controls:

An introductory screen for an interview that has been formatted for the oral history CD-ROM collection.

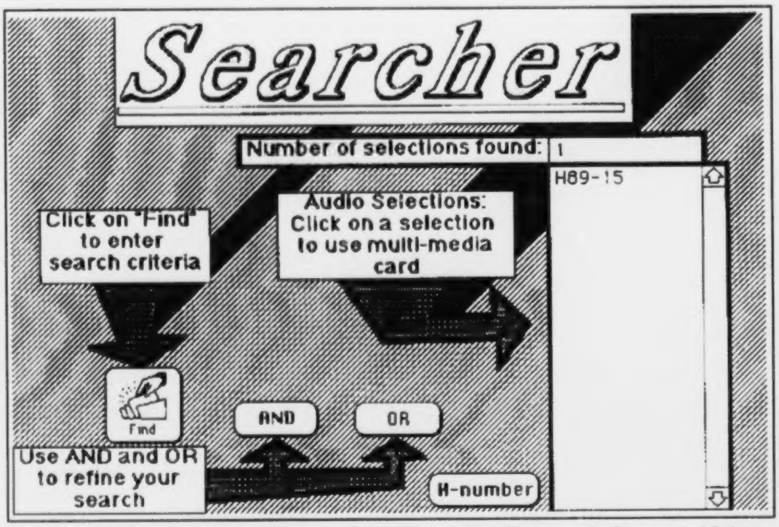
You finally get the recording in your hands — it's a dubbed version — and those of you again that deal with the analog format know that every time you make a copy, you lose some quality. And some of these tapes are recorded on a little $20 cassette recorder, so by the time you make a copy of it, half the time you can barely hear what's going on there. You finally get the tape in your hand — if you're the researcher and trying to look up this stuff — and you go to play the tape, and you have to play through the whole tape to find this stuff, and it may not even be the recording you wanted. So then you go back and you repeat the whole process.

So we thought that — there are several things — one is it deters people from just getting access to this information. People will begin to not even use it. There's a lot of history of past and present here that's just being lost. Secondly, just from a preservation standpoint, how do we preserve this stuff? Well, we started talking about that — we had a real specific need — and were looking at ways to preserve that. It seemed to us that putting it into some kind of electronic, not analog but digital format, and making it accessible with a computer front-end — it starts to work.

Two years ago when I came to this conference, Bill Ahearn was here from IBM, and he was interested in the project, and we were carrying on discussions with IBM and with other folks, Apple Computer among them, and Apple Computer bit first and through Apple Computer and a program they have called "Apple Library of Tomorrow," they provided us with all of the hardware to set up this project.

Basically what we are doing is we are digitizing our oral history collection, and we are putting it into a digital format. Along with that, we're including a database so you can search through and find the tape you want and then play it back immediately.

Apple's interested in it, as IBM was, because it's a multimedia platform. And Apple really is giving us some proprietary software that deals with compression of the digitized sound, because digitizing anything like video-audio takes an enormous amount of storage space. So we're getting some software from them that'll probably be


Searcher
Number of selections found: 1
H89-15
Click on "Find" to enter search criteria
Audio Selections: Click on a selection to use multi-media card
Find
AND
OR
Use AND and OR to refine your search
H-number

The Searcher screen allows the user to find records by specifying keywords.

on the marketplace in a year or two. And they really I think just saw us as a good practical application of this software they're developing. We digitize the audiotapes; right now we store them on what's called the magneto-optical-erasable disk — it's basically an optical disk you can record to, and you can erase it and just use it like any other storage media in that computer.

Our final goal will be to put this right now onto a CD-Rom, and then to put work stations around wherever people may be interested in accessing this information. We're using right now a Macintosh SE as our baseline work station. If you already had one of those you could just acquire the CD and a CD player, and plug it in. We're not married to the CD technology necessarily. Our feeling is once we digitize it, whatever the memory platform becomes in 5 or 10 or 20 years, or 50 years, once it's digital we can move to that platform. Once it's digital, we can make however many copies we want without any loss of quality in the original. Those of you who are interested, I won't go into the technical details now, but if you're interested, I can tell you some of technically what we're doing, and how we're sampling the audio and all of those kinds of things.

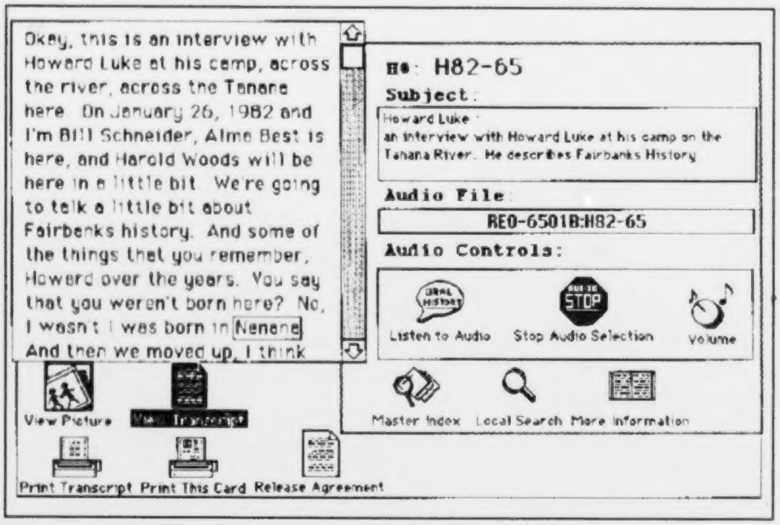
And that's really where we're spending a fair amount of work right now. What I'm going to show you today is a very early prototype of what we have and what we're working on. What we will then be able to do is the access will go directly to the individual who needs to access that information. They don't have to go through an intermediary; they can directly get to the tape and find what's on the tape and listen to it, and even pull a recording off. We can make specialized collections.

One of the things we're working on is a project with the National Park Service — they want to put these around in the parks, for instance in Alaska — that have information on the parks that will cover the range of things. If you're climbing a mountain, you can look at the specific mountain, and see if they've done it before, what routes they've taken. If you're just a casual tourist and want to know a little bit about where the name Denali comes from, you can look that up — you can hear an oral recording. We've also added to this a visual component, because we thought, well, while people are listening to this they want to look at something, they want to get something out of that, and we've added photographs where it's appropriate, when we have those available, of the individuals who are talking, or of the event that was recorded, so we really have a multimedia thing here.

Eventually we hope to move to a platform where we can include video in this as well. One of the reasons we wanted to digitize this and keep as high a quality as possible is that there's a very distinct difference between looking at a typed transcript of the oral recording, and hearing a recording in the environment it was made. So you can hear what was going on there. A lot of the recordings, for instance, were made with folks out in their cabins, in the villages, and in the background you can hear the other sounds of kids playing, with dishes clinking in the sink. That gives you a sense of place and a sense of history that you would lose otherwise.

Let me show you what we've got here. This is a very limited thing — I can't search through a lot of records on this because this is kind of our travelling road show — but I'll show you kind of what we have. This is all being done by basically Bill Schneider, who's director of our oral archives, and Dan Grahek, our programmer. And I kind of dip my hand in and kind of play around with the interface and other things from time to time, and then am the contact with Apple Computer. The project has gone in bits and pieces. Once I go through it, I'll tell you some of the implications that we're running into with funding something like this.

So here we have a searcher, and you say, well, you want to find some things and right now, it says "Nothing's found," up here because I haven't put anything in, but let's say I want to find something... Down here at the bottom it says "H number" — that's just our internal number — if you happen to have a list of those, you could search right through to the recording. But if you don't have that you come over here and you say, "Find," and it says, "What do you want to look for?" I happen to know that one of the three recordings I have in here today is from a guy named Howard Luke, so I'll just put in "Luke" and it says, "Do you want to look for the transcript?" What we're also doing with this is we take the recording and we put in a full typed transcript, so you can follow that along. Because the quality



Okay, this is an interview with Howard Luke at his camp, across the river, across the Tanane here. On January 26, 1982 and I'm Bill Schneider, Alme Best is here, and Harold Woods will be here in a little bit. We're going to talk a little bit about Fairbanks history. And some of the things that you remember, Howard over the years. You say that you weren't born here? No, I wasn't. I was born in Nenana. And then we moved up, I think

H#: H82-65

Subject:

Howard Luke:
an interview with Howard Luke at his camp on the Tanana River. He describes Fairbanks History

Audio File:

REO-6501B:H82-65

Audio Controls:

A search for the word "Nenana" locates it in the Howard Luke interview transcript.

of many of the recordings is fairly low — with a transcript you can see word for word what the person was saying or talking about and, if I can find my pointer, I'll just say, "Look in the abstract," and it's a one-hit.

Now in the final version of this, of course, there'll be all sorts of numbers down here, and you pick the one you wanted. But we'll say we want to pick that one — Dean Gottehrer referred to the problems we have with copyright. One of the problems we have is we had specific agreements with the folks that we got these audio recordings from, and we have specific release agreements, and here it is, and we put it in there. And we've done everything we can to insure that the person will read that. And so there's the release agreement that's here, and of course a person can just bypass all of that, and just click on that "Read the release agreement" without reading it, but what can we do?

Okay, this now shows that this is the number it is. Here's a brief description: "An Interview with Howard Luke at His Camp on the Tanana River." And it describes Fairbanks history, that's some internal stuff that we're using. Over here it places approximately in the state where this recording is coming from. And what we hope to add later on here is a geographic locator, so if you say, "Gee, I'm interested in finding out things about Southeast," you could click on the Southeast and see what kinds of recordings are there, and then combine that with something else like "transportation in Southeast" for instance. So we have all of that down there.

Here's the release agreement again, which you can see — this is all in HyperCard by the way, so I just print this card — we will have a transcript which you can put up there, and there's the transcript of the recording. And over here it says, "Listen to the audio," and that's if we actually want to hear it, and we can adjust the volume. And we have photographs associated with it, and we can select the images. Here's one that's a map and it says, "Here's where we took it from," and we can go back and pick this other image and we click on that and it shows you Howard Luke himself — he's working on a boat. Now one of the interesting things — one of the problems we're wrestling with in terms of copyright — this is a very poor quality photograph; one of the reasons we're doing that is again we have a copyright problem with all of our photographs. We've specifically scanned in our photograph at what we call "reference-quality photograph"; later on, as we do this, we'll have a reference number down here so you can get to the actual photograph. Because one of the concerns we have is if we've scanned that in as a very high quality image someone could take this and hook it up to one of the printers. They could print out that photograph and use it in ways that we don't have a release that it can be used. It becomes a real problem. What we plan to do to archive this stuff is scan all this stuff in at a very high resolution, so at some point when copyright law changes and some of these issues become clarified, we can deal with that higher quality image. But for the work station right now we have a much lower quality image.

And that was Howard Luke. We could search locally in the transcript. I saw that "Nenana" is in there, so I could say "Nenana," and it comes right to "Nenana" and highlights it. One of the things we're getting from Apple Computer is controls — over here where it says, "Listen to the audio," we'll not only be able to listen to it but we'll be able to fast forward. So for instance, you could find this reference to "Nenana" and go right to that point in the tape. That's one of the things — we're working with what's called the "advanced technology group" at Apple Computer, and they're working on the software for us, which is a handy group of folks to have working on your software. So you can jump right to the place that you want to in the tape. For instance, if you had recordings of Jay Hammond, and you want to say, "What did Jay Hammond have to say about the Permanent Fund?" you could pull those pieces out. It makes all sorts of interesting things for people in radio working on documentaries to do research — to find things. The other way we do it, if you really want to be more traditional in your searching, you can go to what we call the "master index," and you can search here.

We borrowed almost everything we have here, and we've got money from different sources. By the way, one of the chunks of money we got to continue this project was from the Center for Information Technology to help us develop all of this, and we really appreciate that, and it's helped us to continue going with this.

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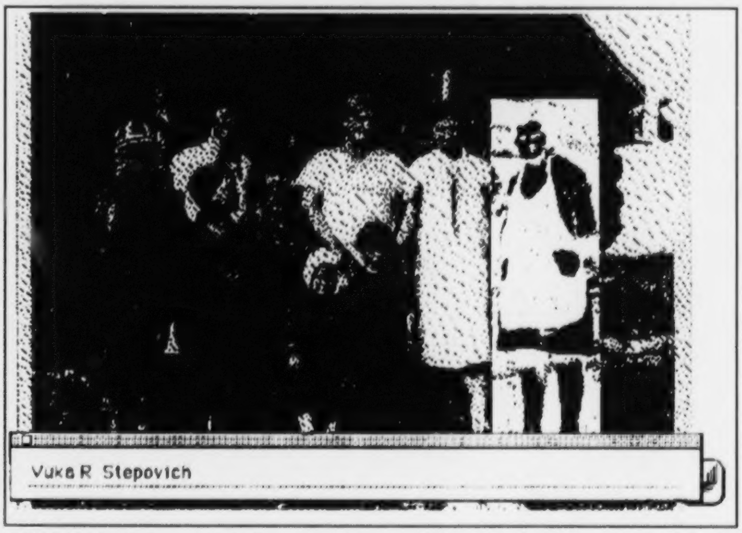

Vuka R Stepovich

Highlighting one of the people provides the information this is Vuka R. Stepovich. This is a reference-quality photo.

You can search through this — this was developed by a guy named Mark Zimmerman, and he works for the CIA; he's their Russian computer expert, and he's the only one they have, so he tells me. But on the side he creates software like this, which is a searcher — so I can search for something. And it says, "What do you want to jump to?" And I happen to know we have a recording in here by Vuka Stepovich — those of you who are familiar with Alaskan history will recognize that name — and here it says, "Vuka Stepovich," and it jumps to the recordings, and there it highlights it, and luckily for me that happens to be the recording we have in there today, and I go over here and I highlight that. This is the way to search through things in a more literary traditional library format. And I highlight the number there, and I say, "jump to the audio card for me," and then that comes up again, and it's going to tell us to read that, and I've read that, and here's Vuka Stepovich, and again you have an audio recording which you can listen to — this one happened to be recorded in Fairbanks as well — and that will come up in a moment.

While you're looking at that, we have again an image, now these are scrolled down — some things we have a great number of images on; some things we have only one image. Here's the interview with Vuka Stepovich. And again, you can go through and highlight and say, "Who was that?" There's Vuka right there, and there's Mrs. Dan Isabelle Egan — who's this down here? Margaret Egan. And you can go through and highlight all of the people... There's one here — Pat Egan. We don't know who that person was. Later when we know what this is we can highlight this and we can click on that and find out exactly where the recording was made, whose cabin this was. So we can jump around here and see all of those things. And if you wanted to, we could print the card. I mean, you could go and get the actual photograph. And you go back here to see the transcript, and you could follow through the transcript because you can't hear it very well. And I can just follow the bouncing finger, and you could follow the recording there.

I want to show you one other interface we have, and that's for the Parks. The National Park Service is very interested in this. We've done an interface for them that's a custom interface, and we're doing a series of recordings with them right now. So we've done this for the Yukon Charlie National Preserve. Right now you'll be able to look at places, subjects, and keyword search — if you're still into keyword searching — or we can look at people. Right now we just have the people interface, and there'd be a number of people. Right now we just have Don Chase, and we have two recordings by him, and I'll just click on this one, and up comes the recording on Don Chase. And there we can search through these various topics that Don Chase talks about. These will be set at information centers in the National Park Service parks. What we do here, instead of a full transcript, is just an outline of the points he talks about. We have a photograph of him; we don't have the audiotape in here for this. You can see here how we'll have the controls for fast forward and rewind, and you can jump right to where you want to go.

One of the problems we find we're facing with this, and it's a larger problem today within the library world, is that the National Park Service is paying for this. So we're paying a lot of attention to that right now because they're the ones paying us. We're doing new recordings for them. The recordings we're going to digitize and put onto them do not include our 6,000 hours of oral history tapes. We got another small chunk of money from the Fairbanks Native Association — we're going to concentrate on some tapes that they're interested in. But what happens is those 6,000 hours of recordings — Vuka Stepovich and Howard Luke —are getting left in the dust. Until we find the funds to pay for that, and we may not find those funds, people are going to come and they're going to use this, and they're going to look this up, but they're not going to be interested in finding Vuka Stepovich or Howard Luke, because that stuff's in an old format, and it's hard to use. And that becomes a real critical issue: Who's making the decisions as we move in to new formats and new and easier ways, in my opinion, to access information? Who makes the decisions on what things we put in that new format, and what things we leave behind?

For instance, one of the things I do is put CD-Rom databases onto local area networks so that people can access those. In fact, we now have dial-up access, so anywhere in the state, potentially, you could dial into this network I've put together in Fairbanks and get access to 12 different databases covering a broad range of topics with about 10 million citations in research. The problem is, we're finding that as students and faculty and researchers are coming in to use that, that is not comprehensive coverage, but it's easy to use, comparatively. It's certainly much easier to use than going through large books with small fine print. And we've actually had students come in to use something, and we've said, "This only has coverage on the CD-Rom for the last year of information." For instance, we have one called "statistical masterfile," but if you want to get coverage for the last 10 years, it's over here, and that may be more help for your research, and they say, "Oh, it's print. Forget it; I'm not even going to look at it." They're going to look just at the stuff that's there, that's in the nice pretty format on the computer. And how do we deal with that? Some of those things are going to drop away.

There's a series of research materials called "The Arctic Bibliography" — 15 volumes, print — comprehensive social, economic, scientific research on the Arctic. They stopped printing it about 15 years ago — I'm not sure of the exact date — and they've gone to an online version. People use the online version. We've tried several times to get funding to digitize the print version and make that also electronically accessible. We've gone to people like the National Science Foundation and they say, "We're not interested in that; let's deal with this current stuff." Eventually that 15 volumes of information on the Arctic is going to get used less and less. And so the kinds of things we're doing here — I really believe in this kind of stuff — and we're moving ahead with this, and I really see that we're going to get to a point... we're going to have this available first on our computers.

We're probably six months away from having the National Parks Service stuff done; another year or so from actually having a product that's available in our library. But once we do that in Rasmuson, and then put it on the local area network that we've got, and then our next thing — we've already been experimenting with passing this through the university computer network so that you don't have to have a Macintosh computer, it could be an IBM or other flavor of computer — you can access this information on the network. The problem is, when the money comes in, are we going to have access to all of the tapes that are there or are we going to have a select few, and who's making those decisions on the select few? So from my point of view, it's not the technology — this is the fun part, and you play around with this, and talk about the user interface. And that's what we're doing now. We're moving ahead with that and that's going to happen one way or the other. But the real problem comes in with who's going to have access to it, what materials are we going to make accessible to people. That's a real quick overview of our Project Jukebox. I'll be happy to answer any questions anybody's got.

LARRY WIGET: What is the estimated cost for digitizing 6,000 hours worth of tape?

SMITH: For 6,000 hours worth of tape we're going to be probably somewhere around $150,000 to $250,000. A lot of this stuff is just manual things. We have to do transcripts for everything, the full transcript. It's one-to-one right now that we put the tapes on, but with the compression we can save a lot more of that. By the way, this digital storage of archival materials is still a controversy. The national archival organizations do not accept digital storage right now as a standard. We're going to present this at a conference in about two weeks — there's a national conference of oral historians and archivists, and it will probably create quite a controversy because this is not accepted as an appropriate means of preservation.

HOWARD WEAVER: How would those expenses be affected if you weren't retrofitting, essentially. That is if you were to start doing it now, would that reduce that appreciably?

SMITH: A lot of the costs would be reduced. I mean, right now, we've been working on this for over a year — and I only have received three recordings, and they're not even full recordings — because we've been doing a lot of development work and we continue to do that. So the costs will go down some. But it'd still be the basic costs of getting the transcript and paying the staff to sit there and put the recordings in, and quality control. But those should go down. One of the things we've been doing is developing here a kind of a cottage industry that I think somebody in the private sector should be interested in because the National Parks Service has given us two chunks of money to do things for them; the Fairbanks Native Association is interested in it. We've had some discussion with BP about this; I think there are a lot of organizations where you can do this kind of a thing. And what we're really moving to — we started out with specific problems with oral history tapes, audio recordings — but we're really migrating to a point where this is a multi-media product for preservation of records which would include photographic records, film, videotapes, print. It would include the whole spectrum of records.

LEN FRAZIER: Have you worked out a method for enhancing the recordings? Is it possible, for example, to remove background noises?

SMITH: Well, we can. Yes. We've been working, and the guys at Apple have given us some software, and another company... it's marvelous when you work with someone like Apple, because they talked to a smaller company in Silicon Valley, and this other company says, "Oh, they're working with Apple; here, have some software; here, have some support." We got a nice product from a place called

DigiDesign, and we can actually go in, and we can filter out certain frequencies, background noises at a certain frequency, and we can just filter that out, cut it all out, cut out the highs and the lows. The question it gets into though for us from an archival standpoint is do we want to change the original recording, do we want to change the way that that was done? If this was recorded in a noisy auditorium, do we want to filter out that fact or do we want to leave that in there? We can certainly do that. But what we're dealing with right now is we're going to make an archival copy of the tapes that's the highest quality we can go at, and we're going to store that probably not optically, but probably on one of the new digital tape backups.

Those of you who do computer stuff — 8mm tape and digital-audiotape , you can store gigabytes of information on that stuff. We'll probably do that and reduce our shelves and shelves of tapes down to one shelf with all of our 6,000 hours of recordings. And that will record everything — problems in the recording, all the noise and everything. We'll then use with the compression that we're using from Apple Computer — the stuff they're giving us is virtually lossless compression; it means you don't lose any of the quality. But we'll probably take that, probably cut out some of the other information for what we would call our reference-quality recording, change it to something that would be a high-fidelity recording, to something that might be low-quality voice-grade recording. So there we may deal with changing the original recording a little bit.

But again it becomes a problem. As you mentioned, there's the capability to fix photographs, and we have a lot of old archival photographs. I had a guy from Kodak come see me the other day who was showing me their new electronic imaging. He'd take an archival photograph, it had scratches through it, and was dated 1898. They digitized it and they cleaned that all up. It looks like it was a photograph that was taken yesterday except for the clothing that people were wearing. We may want to start doing that. What then do we believe is the original? We get into some real interesting ethical questions here with the preservation of materials.

MICHELLE CORDER: I'm curious about the genesis of this wonderful project. Apparently there wasn't actually a heavy user demand to use these fragile materials as much as it was an administrative decision to make an attempt to preserve for archival purposes your collection.

SMITH: We had, I don't know what the numbers are because I'm not directly involved with the oral history program day-to-day. Bill Schneider, though, the director of the program, felt there was a need — that people were trying to get into the tapes and it was cumbersome basically for us to find the recording somebody wanted and get it into their hands. And then the preservation is a real issue.

CORDER: So it was sort of the archival part of the university rather than the library part.

SMITH: It was the archival part. Will is an anthropologist by training, he works in the library, and he has a real keen interest in rural Alaska and Native Alaskans. He sensed from working with them that there's a whole culture here, an oral tradition, that we have preserved on a number of these tapes. He's gone out and sought out and collected tapes with elders in villages, and a lot of other people from the villages, and he has a vision that eventually there'll be a machine like this in the schools that the kids could go to in their village and find out what their grandfather or great-grandfather had to say — that this stuff will be there, and that the kid could sit down with this and open it up and find out the history of his or her village, or his or her region of the state. The whole constitutional convention is on audiotape. We put in a proposal last year — that didn't make it — to include some of that so you can sit down and hear the actual debates that went on at the constitutional convention that developed the constitution for our state, you can sit down and study that.

DEAN GOTTEHRER: I used to take students to the library every semester in my magazine-article writing class, and one of the places we would stop was the archives because it's a veritable goldmine of material for magazine free-lance writers who are looking to write stories about Alaska. And with stuff on tape you've got to go through the whole process that Steve was talking about. And if you're writing an article, you then have to do your own transcript to try to get that material out so you can use it in an article. It's far easier to use the photos although you have problems trying to locate what it is you're looking for and to have a copy made that you can use. I think that the demand was there. The problem was getting access to the materials, finding what you're looking for and being able to use it.

WEAVER: What will happen to the basic environment when you're done with it? Will it be proprietary? You guys will own it? Or Apple will own it?

SMITH: We'll own the product that we have. We plan to have one basic product. The first kind of thing I showed you is our oral history one, and we'll own that. We haven't really gotten to the point of discussing, say with Apple, what we do if we need to license that out, or if people just want to buy the engine that we have, and then use it. I think this would be a great one for somebody in the private sector to go to Science and Technology grant in the state, to take this on and develop that and then sell that to companies. Other places like the Park Service — they'll own the one that we do for them — we'll have all the program; they'll just have the end product. And we'll make a version where they could add their own tapes if they wanted to. But we're doing all the development work for them — so we're customizing it by client right now.

AUDIENCE MEMBER: What kind of legal or ethical hurdles do you have to get over archiving materials like that? Is it a legal problem or primarily an archiving one?

SMITH: It's both, but primarily a legal one. We're very careful with our archives department. It's called the Alaska Polar Regions. When we acquire collections from people, we'll get just a collection of documents or a collection of photographs or a collection of recordings spelling out — and basically what that release agreement you saw there was — what the rights of use for that is. And then we charge people to come in and use it. Some things you could use for commercial ventures. We'll have television producers come in and they want a bunch of our stills or some of our videotape or film to use in productions and some things aren't releasable for a commercial product; other things we can. There's a restaurant in Fairbanks called the Pump House but they went into our archives collection and made copies of the photographs, and they paid a fee to use the photographs. That's why we're really... Some people are very apprehensive, they're scared to death in fact of archives.

When you go to this kind of digital format, you can hook this up to a high-quality recording machine, you can hook this up to a high-quality printer, and if we have the high-quality images in there, and if we keep the recordings at a high quality, people can pull that out and use those things for whatever they want, and use them out of context. That's a real problem we have. We've made an intellectual decision at this point because we could make it so you could access the tapes anywhere you wanted. And you can do some of that now. We have a fast forward that I showed you that we'll be putting in there to look for a specific word. We made an intellectual commitment that you find the transcript for the tape, you see that, you see the abstract and then you access the whole tape. So that you get it at least in context. Because again, let me go back to the example of Jay Hammond, what he said about the Permanent Fund, you could pull that out of there, or we have recordings of Walter Hickel, you could pull that out of there and use it out of context very easily with this. That's a real danger.

JOHN McKAY: Do you see that as the role of the university? Sort of to monitor whether people might take university materials, reference materials, library materials and use them like that?

SMITH: No, we don't want to be a policeman for that. We do try to guard carefully the people who have given us materials, guard the rights that they have set up with us. Of course, once it's out of our hands, we really can't do that much. For instance, on every Xerox machine in the library we have a thing that says, "You are responsible to make sure you don't infringe on copyright law, Section X," but we really have no control, if somebody wants to come in there and wholesale plagiarize by copying page after page out of a book. An instructor, say, making copies of that to pass out to a class is infringing copyright law. The only place where we really clamp down is — the way the copyright law reads now is that it says the person doing the duplication is going to be held liable — so for instance if we have an instructor bringing videotapes to us, and he says, "Here, copy these; make a hundred copies of these to go around," we say, "Where's your copyright release?" from the producer of this program. No copyright release, no copies.

AUDIENCE MEMBER: (Portions of question inaudible) There doesn't seem to be private enterprise doing embellishments of...

SMITH: Well, I think there's some private enterprises out there doing a lot of this, and there's a lot of efforts similar to this on the national level. Smithsonian's been working on this; Library of Congress has had several projects like this. There's a lot of activity, and there are private vendors out there that will do some of this for you. We haven't seen anything within the oral history specifically, the oral history group in the United States that's doing this. We have one of the largest oral history collections around at our university. There hasn't been that much. But I think there's a huge market — that's why Apple Computer gave us a bunch of equipment to do this because they want us to test out their software. There's a hot competition there.

HERBERT DORDICK: Are you thinking of going online? Would it be possible for me to access this from another city?

SMITH: That's our eventual goal, to go online with this, so that you could dial into this and you could listen to the recordings. Right now we have some severe limitations with the pipelines. In computer terms, if you go on at 1200 baud to listen to audio you're going to be sitting there all night long. But those things I really think are solvable. With compression, with the ways that we're moving into fiber for transmission — that's going to be solvable.

DORDICK: Then you've given up the copyright protection. The only means of copyright that will work is when you have some node which can control. Once you go online you don't have that.

SMITH: That's one of the reasons we went with the much lower resolution on the photographs — we call them "reference-quality" photographs. And if you want to get a high-quality reproduced photograph then you've got to get in touch with us, and we'll make that for you. I think it's the legal issues that are going to be the sticky questions in all of this. The technology's moving ahead. The networking stuff I'm doing with CD-Roms right now — I'm dealing with the vendors on that, and some of them say, "No, you can't do it at all," some say, "Gee, we don't care," and others say, "There's a fee we charge you for that." It's all over the place; it's a very sticky wicket.

DORDICK: If I were really interested, I could take your photograph and enhance it after I've received it.

SMITH: It'd still be possible to enhance the thing and get around it. Yes.

AUDIENCE MEMBER: I guess I still don't understand. Watching an NFL football game, they tell you you can't record it, and if you record it, you're doing what they told you not to do in the first place.

DORDICK: But that's okay. The copyright act allows you to make one copy for your own use. It's if you make copies for all of your friends and charge them for it.

AUDIENCE MEMBER: Like you said, stealing's stealing. Instead of reading that, you might both have them read it and bring it out in an audio — the agreement. That's part of the deal. I don't see the issue. Because we have that in books. What's to stop somebody from putting on a Xerox a photograph of a book — it's the same thing.

SMITH: There's no way to stop them. But again, if you make multiple copies... There have been universities, for instance, that have had major lawsuits against them when they make copies wholesale that are used in classes. Because then the publishers are not paid for students buying those books or buying the periodicals. It's the wholesale copying and distribution. And where we would have problems here is if somebody without paying for the rights took some of these audio recordings and used them in a commercial product. If someone made something comparable to the Civil War series on PBS about Alaska, and they took all those recordings and made the videotape. And they sold the videotape, and then we'd see the tape, and say, "Gee, we never got a call from these folks for permission to use all these oral history recordings." There's where the rub comes in.

Computer Conferencing:

'Let's imagine you're at a party with Isaac Asimov, Woody Allen and Bill Gates'

Davis Foulger **is a member of IBM's computer conferencing work group at the Thomas J. Watson Research Center in Yorktown Heights, N.Y. His duties include running the oldest and largest computer conferencing system in the United States.**

I'm going to talk in general about what computer conferencing is, and then I'm going to get into some specifics about the computer conferencing system that I run for IBM. Just to give you a brief overview of the kind of sheer volume we're talking about, over the last year the conferencing facility that I run at IBM has had contributions — not people requesting things or reading things, but actual contributions — from over 25,000 people, which is about 8% of the entire IBM company.

The rate of those contributions is tremendous. We get about 2,000 contributions a day. Now we're only one computer conference. Ten years ago there were none. When we started out, for two years we were the only one, but now there's several thousand computer conferencing facilities inside IBM, a good 300 of which are what you might call "public" in the sense that any IBM employee can get to them, as is the case for IBMPC.

Much of what I'm going to say comes from the doctoral dissertation in which I observed the evolution of the facility over 10 years — actually eight years at the time I wrote it. Various genres of computer conferencing and a lot of different things that conferencing can be used for — education is certainly one of them, but it's only one. I will wind up talking to that to a certain extent as we go through.

I've talked about how rules formed on the conference, how enforcement evolved and the kinds of problems that we had, and ultimately the kind of impacts that were involved. Today I will focus to a large extent on the impacts after I give you a general idea of what it's all about.

To put computer conferencing in focus a little bit before we go too much further, let's imagine that you're at a party. We've all been at parties where there were 50, 60, 70 people — and what happens at the party is that people break up into groups. There'll be a group over here, and a group over here, and a group over here, and each of them is having conversations. Maybe as you go through the party you wander from one group to another and you wind up engaging in a variety of different conversations.

I don't know about you, but I've had the experience of being in one group and overhearing something going on in another group and saying, "Boy, I really wish I was in that conversation." Let me take this a little further — let's suppose that I'm going to a party and I know in advance that there's going to be a conversation with Isaac Asimov over in this corner, and there's going to be a conversation with Woody Allen over in this corner, and there's going to be a conversation with a major economist who successfully predicted the fall of Communism in Russia over in this corner and, to give a pleasant contrast to my own company, Bill Gates is going to be over here in this corner.

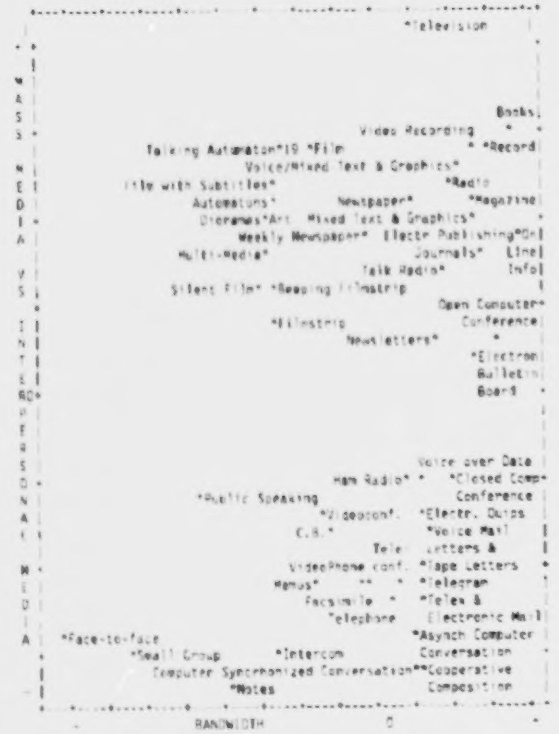
You go in there and you know you can only be in one of these conversations at a time, but you know absolutely that you'd like to be in all of them, and you know standing in any one of them that something's happening in the other three that you wish you weren't missing. The truth is that happens at any party. The real problem is that what you'd really like to see is all four of these guys in one conversation, with all the sixty-odd people at the party able to participate in some reasonable way. But there's no way to do that because communication in groups breaks down after you get five or six people.

Well, that's the problem that computer conferencing addresses. Computer conferencing in some sense allows you to have a party in which you can be in all the conversations. The guy who was sitting up here during the panel before talked about how he accesses Bitnet. He's getting 100 messages a day, and he's in all these different conferences. In essence, what he's doing is he's saying, "These conversations are interesting to me and I'm going to participate in them." And as is the case in most conversations where there's a large number of people involved, most of the time you don't talk; most of what you do is you read. Computer conferencing is very good for focusing you in on the reading because it's a lot faster to read than it is to write, but you can write. And what's really interesting here is that at a party, if Woody Allen was over in a corner, the odds are that Woody Allen would do 50% of the talking or more. But that doesn't have to be the case in computer conferencing at all, because one of the things that happens in computer conferences is that established relations tend to fall away — they don't disappear. If Bill Gates came up on one of my conferences and started talking, he would get a level of respect that I will never get. But then again he did something that I didn't do. In 1977 he and I both believed that personal computers were going to be very successful. What he did is he predicted it in a way that made him a billionaire. What I did was I predicted it in a way that put me into graduate school. Now I don't regret going into graduate school, but I could use a billion dollars.

In any case, getting back to the general focus, I'm going to get real abstract for a second. I think I've described in some sense what a computer conference is all about. What I'd like to do for just a second is to put that in context for you, and to do that I have this wonderful, difficult-to-read, but very visual sort of graph here. What I've got here is an assemblage of about fifty or sixty-odd different media: face-to-face communications, small groups, large newspapers, newsletters, talking automatons, you name it, all sorts of different media communications.

I did this because I was curious about where computer conferencing fits into the constellation of media. I collected this list of media and I took a basic set of characteristics that one could support, and I described them, and then did a typological study. This is the result of that typology projected in three dimensions. If one were to look up and down here, down at the bottom of this line would be media that very few people are involved in at the same time. That's why you'll notice that all the way down here I have face-to-face communication. And all the way up at the top I have media that lots of people can be involved in at once, and that's why you'll notice all the way up there is television. If I roll out this way, bandwidth changes and these are high-bandwidth media — places where you can touch and see and smell — lots of bandwidth happening simultaneously. These are low-bandwidth media, for instance a letter. Then going off this way, we have an interactive kind of thing: media that are over this way, towards this wall, tend to be highly interactive, and media that are over this way tend to be kind of static, presentational.

The reason for showing you all of this is that there's an interesting dynamic here. There is a center in this picture, and you'll note that as a picture it's pretty symmetrical — the line is straight up and down, and the lines go out, and if I look at the exact center of this symmetrical picture, there's one medium, not necessarily really far away from all of it, but it's sort of there: it's right in the middle, sort of in the middle of bandwidth, in the middle of audience size, in the middle of everything, and that's computer conferencing.



And that's what computer conferencing's unique contribution to communication is. It provides a medium in the middle that provides a mix of characteristics of all different media that allow us to do things in a simultaneous way that's different. Computer conferences like IBMPC have a lot of the characteristics of mass media like newspapers. What I do on IBMPC is in effect the role of an editor. I set editorial policy. I say what does and doesn't fit under that editorial policy and I wind up enforcing it. But what I'm enforcing isn't what happens in the newspaper at all; it's what happens in day-to-day casual conversation.

What people do when they get on IBMPC is they say, "Gee, I need something that does this," and somebody says, "Well, I've tried this and it worked," and somebody else comes along and says, "Yeah, that sort of works, but I've tried this and it works even better." And then somebody turns around, and what you have is a conversation. If you will, it's "conversational journalism" — interactive mass media, mass interpersonal relations — and it's all a function of this middle ground that computer conferencing uniquely fits in. So it's a different kind of medium that allows you to do things in different kinds of ways.

IBMPC is a large computer conference; it's been in existence for just about 10 years. We have in excess of 25,000 contributors, perhaps 100,000 to 150,000 participants; about 1,500 to 1,600 active forums. What I mean by active is that somebody's appended something to them in the last 13 months. Some of those conferences are very active, getting 40, 50, 60, 100 appends a day. It adds up to a lot — these days it's close to a thousand single-spaced pages of appends per day. And it's shadowed at over 700 locations around the world.

This last concept, "shadowing," I think is very important to why IBMPC is so much larger than most computer conferences. It's an attribute that it shares with things like UseNet in some sense that are also successful. What shadowing is is that we don't have one place that holds the content of IBMPC; we have 700 places.

When people get onto IBMPC in IBM, most typically they're not looking in their mailbox; they're looking directly at a copy of the whole thing. What that means is that they can have front-end tools that aren't mail-oriented but are conferencing-oriented. In effect, people wind up editing a file, usually an append at a time, but they have the ability to jump forward by subject, to jump back to referenced appends. When they come in they can jump to the last append that they haven't read, and if that append doesn't have context for them, they can jump back and see what that context is. As they go through — if they want to respond to an append, they don't have to append in place; they can say "mark" and then go on, and when they're all done reading everything, they can say "go mark" to go back to that place and respond if they don't feel anyone has responded adequately — or skip it altogether, if they feel someone has.

These characteristics have helped to make our facility very successful. In some sense, many of these characteristics are very distinctive to the kind of system that we have. We get away with it because we have a very large uniry network in the sense that everyone looks at things the same way. We're not connecting DECs and HPs and Macintoshes and all sorts of different computers together. We're really just connecting VM systems, MVS systems, and these days OS2 systems and UNIX systems.

One of the key elements is the wide area network, and one thing that's really key about it is that it's an overhead network. That is, the network exists in the company as a fixed cost. Once you start broadcasting over the telephone lines, it doesn't matter, as long as you don't meet the maximum amount of traffic that line will carry — that's usually difficult — it's a fixed cost. The network was already there for handling electronic mail, for handling file transfers, for other business purposes; we simply put computer conferencing on top of an existing network. The incremental cost for having computer conferencing at IBM probably isn't zero, but it isn't lots of modem calls and all the time at very high long-distance charges.

Note that this particular characteristic of having an effect of fixed cost overhead connecting many nodes that people can connect to is exactly the kind of philosophy that allows Prodigy to offer a fixed-rate service because everyone who dials into Prodigy makes a local phone call to a local node. That local node is networked on a fixed-cost network. So Prodigy's costs don't rise as the number of people dialing in rises. Since every one's a local phone call, their costs don't rise either. They're not the only one to do that; other companies have come in and found ways to do local-node access arrangements in various communities. Prodigy's the only one that's done it throughout the United States at this point, at least in the Lower 48. (I was quite distressed to note that I wasn't going to be able to write my wife from Alaska.)

Something called the "Tools Computer Conferencing" software — IBM actually has two major pieces of computer conferencing software: Tools is one, the other one is called GroupTalk. They operate pretty similarly. Tools happened to evolve at IBM before the GroupTalk software did, and the net tends to be what we use inside the company, even though we sell GroupTalk outside. GroupTalk is also pretty widely used inside the company, and has all the characteristics of Tools.

Then there's two key terms to be aware of that are used: "forums" and "appends." When I say that IBMPC has 1,600 forums, each of those forums is a separate file and a separate topic. When somebody in IBM wants to talk about Macintosh computers, they get on MAC Forum, which incidentally opened the day the Mac was announced. Inside those forums we have appends, and appends are individual contributions. Those individual contributions are the individual things that people write.

Just to give you an idea of the kind of growth we look at — in the early going, growth was kind of slow; actually a fairly standard s-curve. From the opening of IBMPC in the month that the IBMPC first shipped through late 1984, you basically had a very low curve, almost linear growth, at about five appends per month. After that point, we accelerated at a rate of about 15.5 appends per week per week. That general trend has basically continued and we were operating at about 15.5 appends per week per week acceleration until about April of this year.

In April of this year something odd happened, and the s-curve didn't work. You may recall that early this year *Business Week* and elsewhere had pictures of John Akers cursing to the troops at IBM. Needless to say, the people at IBM who heard all this, some of them said, "Yeah, you're absolutely right," and others said, "Boy, this is pretty rotten behavior," but what everybody wanted to do was to talk about how we could fix the company. And what happened is that we opened a forum on IBMPC called "AMS ROUND Forum."

Now AMS ROUND Forum did three really important things: One of them was to make my life a living hell. The first of the things it did is it established the all-time record for forum growth. We handled upwards of 200 appends per day for the entire three-week period that AMS ROUND existed, just for that forum. The second thing, though, is that it gave a lot of people who weren't necessarily interested in conferencing for how it could help them do their computing an interest in this place where people were discussing how we could improve the company. A lot of new people came to IBMPC as a result. I was getting 300 contributions a day increments just in that forum; but I was getting 500 contributions a day increments altogether in IBMPC during that period. When we closed AMS ROUND, the volume didn't go down, and now we're accelerating at about 20 appends per week per week pretty steadily ever since that happened.

'There are forums that are entirely information, there are forums that are entirely discussion.'

Our growth has been pretty steady and pretty fast. When I talk about my life being a living hell, I worked about 20 hours a day during a four-week period just keeping track of things. Then when it was done, I had a maintenance nightmare keeping IBMPC alive because of the added growth, and still do to some extent. But in any case, that's a separate issue that doesn't really have to do with your concern so much as a general concern. Once you have a large number of shadows, you have to start planning your disk increments. I can no longer say, "IBMPC is too big for its britches any more; I'm going to add 50 megs to it tomorrow." I have to tell them months in advance so everybody else can be bigger before I grow. Right now we're planning to grow in January.

In our experience with IBMPC, a variety of genres of computer conferencing have arisen. When I say "genre," what I mean is recurring patterns of interaction . . . certain kinds of forums that represent a certain kind of application of computer conferencing. Because it's an application that is consistent it tends to draw the same kind of interaction patterns over and over again. That's what happens when you have an application. Newsletters tend to be very similar; and newspapers tend to be very similar. Newsletters are more similar to each other than they are to newspapers. Newspapers are more similar to each other than they are to newsletters. That's because in some sense they represent different media or different applications. Well, the same thing happens in computer conferencing.

One big issue that happens in there is the whole issue of discussion versus information. A lot of what differentiates the genres of computer conferencing that we have on IBMPC is the issue of what people are looking for. Are they looking to discuss things, or are they looking to find out things? If they're looking to find out things, they're information-oriented. If they're looking to discuss things, they're discussion-oriented. There are forums that are entirely information, there are forums that are entirely discussion, and there are forums that fall in between, each according to various kinds of application.

One of them I call computer-mediated querying, and this is kind of an interesting one. A case back in 1985: A guy came up to me and said, "I have a problem. I'm writing a manual for a program, and what I need to do in this manual is to reproduce the screens in the program, and I find it's very difficult to reproduce these screens by hand. Does somebody have something that will allow me to capture the screen image and print it?"

In 1985, that was a difficult question. Not everybody in the world would know the answer to that. I could tell you that you could have called Computerland, because I called three of them, in 1985, and asked the question, "What program could I use to capture a screen?" And there's a high probability that they wouldn't know the answer. In fact, none of the ones that I called did. You could take a copy of *PC Magazine* and go from beginning to end, and I did this as well, and not find the answer to that question either. Even though there were programs in there that would do that, it's not a common-enough application that anyone would have thought to say, "This is something you can do with this program." In fact SideKick in 1985 was capable of doing that particular function, but you wouldn't find that function listed in SideKick in any of its ads. Today with clipboards and things like that, it tends to be a little simpler than it used to be. But then it was a complex question.

I could go on. One thing I tried was a telephone tree. I called a guy I thought of as an expert and said, "Do you know?" And he said, "No." "Well, do you know someone who would know?" And he said, "Well, you might try this guy." So I called him. I went through about 10 people, and I didn't find any through that guy either. The point is it's not necessarily an easy piece of information to find. It's a reference librarian's nightmare: How do you find a really esoteric piece of information?

Well, what happened in December of 1985 is somebody posted this question to a forum on IBMPC called IS THERE Forum. ISTHERE Forum is exclusively a forum for short questions and answers of the form "is there a way to do this?" The guy said, "Is there a way for me to capture screens so I can put them into my manuals?" I've already told you a variety of methods that basically failed. I'm going to tell you he had five answers to his question in one hour representing six different programs he could use, four of which he could download without leaving his desk.

What happened here? What happened here is we used the human database — the human database. Lots of people know the answers to questions. The problem is how do you connect your need with the person who knows the answer. Well, computer conferencing is an answer to that question. When you have large numbers of people reading a computer conference, oftentimes you can find an answer readily. The fact is that that particular case has been replicated hundreds of times on ISTHERE Forum, and other computer-mediated query types of forums on IBMPC. ISTHERE Forum is the 11th or 12th fastest-growing forum on IBMPC — has been ever since it started.

Another variety of computer-mediated genre is the electronic memorial service. Again we've seen this in one form or another several times on IBMPC. Most recently when IBM decided to sell off its Lexington division, the Lexington employees decided that it was a funeral for them. A better example would be when the space shuttle exploded. Large numbers of people got interested in computing because of their interest in the space program and technology and stuff like that. A lot of people felt really bad. (I was the 15th guy in the United States to get a space exploration merit badge. The first 14 got to go to Houston. I got a merit badge that Ed White carried into space just before he died. But that's rare. It's on my wall.) In any case, I cared about that; a lot of people cared about that.

What happened is that a forum opened up called SHUTTLE Forum and within hours several hundred people had said, "Gosh, this is what I feel and want." It became very cathartic and helped a lot of people who might have gone home, or might have called home and just sat there with their ear to the telephone listening to the television that their wife had on at the other end, or gone out to their car and listened to their radio, to deal with the event and get productive again. That's a very corporate kind of attitude. The fact is that dealing with your emotions is one of the most important aspects of dealing with something like this. You can actually see in SHUTTLE Forum all of the four major stages of grief that are quoted in Kubler-Ross and other folks.

Another major forum is what I call "meta-forums." Meta-forums don't happen unless you have a big conference. Meta-forums are forums about the forums. What will happen every once in a while in a forum is that somebody will say something, and somebody else will say, "That doesn't belong on this forum." Then you'll have a big argument about whether or not that thing belongs on the forum. We don't have those on IBMPC any more — at least not in a forum. What happens is that if people think something doesn't belong in a forum, they can write a note to the appender, they can write a note to the forum, or they can write a note to me. Or they can get onto one of our meta-forums and say, "I don't think this sort of thing belongs on that kind of forum." And people discuss it on the meta-forum. That way discussion doesn't stop on the regular forum.

The meta-forums are very important because they're where many of the rules of IBMPC are formed. Then we have something called lightening rods. The meta-forums sort of led into lightening rods. Lightening rods are forums where you can put things that don't belong anywhere else. We have a forum on IBMPC called TEMPMISC. It used to be called SOAPBOX. We changed it from SOAPBOX to TEMPMISC because people saw SOAPBOX and said, "This is a place where I can expound my political views at great length." And that isn't exactly what we wanted. But TEMPMISC is a place to put something that doesn't belong anyplace else. What that does is it draws that kind of stuff away from forums where it doesn't belong, and as a result those forums stay on track.

Electronic focus groups. Electronic focus groups are in a sense voluntary explorations of what ought to be done. We have a forum on IBMPC called SMARTCAR forum. SMARTCAR forum basically started with, "How could we use computers to make cars safer?" What's happening there is that people are imagining that. We have about 80,000 lines of imagination about how we can make cars safer. Some of it very good; some of it not necessarily out there before. Some of it potentially useful to the folks at IBM who market to the auto companies.

I could go on. The point is that there's a variety of different kinds of things that go on. Electronic seminars become in effect self-motivated voluntary classrooms. We have a DEMMING forum on IBMPC where people have been learning about the Demming management principles on a voluntary basis. People who have read the book are educating other people. No formal teacher, but a regular, on-going discussion where people learn.

Interactive software development. A person puts a piece of software out for other people to try. They use it. What happens in these interactive software development forums is they come back and say, "This is a really great product." This is a very generic kind of interaction for this forum. "Page is an excellent program. I'm really glad you wrote it. It has all the great functions I need, but could you add this...?" "But I found this bug." Then you get a little discussion around that. Oftentimes, from many programs on IBM, you get fixes within hours, new functions within hours. We have about 10,000 pieces of software online that various people have written, and many, many forums service that software.

This has recently extended to our OS2 development work. Many of you may be aware that one of the things that IBM has done with OS2 2.0 is try to take it out into the field and give it to customers and take it out to the company and let lots of people try it. So that instead of testing it through a formal testing mechanism, which you can always do anyway, we test it on real people in real applications. There are a whole bunch of forums on IBMPC which are OS2 v2-oriented forums. All of them are suggestions, bug reports, the whole nine yards. We have got 10,000 people in the company using what is in effect a beta test code, and reporting on their own interaction, their problems and what not. This has been very successful. We previously did it with printers, and it's been very successful there.

Voluntary newsletters tend to be very informative kinds of things where people post information. We have something called "NEWSCLIP Forum." What's NEWSCLIP Forum? NEWSCLIP Forum is relevant computer industry articles, which get posted online for people to read.

There's a lot more there than one could say. None of this happens in a vacuum. Some level of control is needed in order to keep things running reasonably. Those who are on Bitnet or UseNet might argue that that's not necessary, but in fact if you checked out the details of real bulletin boards on Bitnet and UseNet you'll discover all sorts of subtle controls in place. One interesting control I recently learned about, is that many UseNet boards won't post something if the number of lines of comment exceeds the number of lines of quoted referenced append.

Transience of Problems

1986

- •No shadow
- •Quality of information
- •Complaining
- •Information overload

1988

- •Unconstrained discussion
- •Finding things
- •Network speed

Ongoing

- •User interface
- •Tight reviewing/censorship
- •Keyword search

We have a set of formal rules based on IBM business conduct outlines. We also have a set of informal rules that people inside the conference have negotiated for themselves. For instance, if you say something funny, you're expected to indicate that by either a grin or a smiley face, in effect an ampersand-dash-closed paren which indicates that you're smiling at what you've done. What that does in effect is it tells people that this is a joke; and that's very important because without the usual non-verbal accompaniments, people don't always get it. We've had cases where people wrote things that they thought were jokes and had vice presidents from the other side of the ocean write to their management about this horrible thing they wrote. So it's very important that those rules have evolved.

One area is this whole area of meta-forums. One thing you run into in meta-forums is "murder by meta-discussion." The problem of murder by meta-discussion is that if enough people disagree on whether or not something should be on a forum, all regular forum discussion on that forum will cease. Eventually all the readers will go away because the only people who are interested in the debate are the debaters, and they can wind up filling all sorts of time with it.

There's another side of rules and that's enforcement. Part of it is a formal reviewing process — those of us who are concerned with the formal IBMPC rules. What's more important is the informal reviewing process where people tell other people, "You shouldn't do this." What happens is that when a person does something that's really against the IBMPC rules, they'll know that because they'll get notes from a hundred people. What happens when you get a hundred notes from people when you do something? You tend not to do it again. It takes time to work off a hundred notes — self-defense.

Now some of the powers that work there; well, expression is the most important one. The most important thing you can do is to tell people that something really isn't the right way to act. But you can erase appends; we even have something called the "appendectomy;" the appendectomy is when you do a large number of appends at the same time. Ultimately, and rarely used, you could actually deny access to the conferencing facility. We have the capability of doing that. Or even of bringing the person's manager in, which I would regard as a last resort.

What are the problems of conferencing? The problems of conferencing depend to a large extent on the kind of software you use. The kind of software that I use tends to get rid of some of the problems that lie in the mailboxes that you might encounter on UseNet or Bitnet. But we do have problems. What's interesting about those problems is they tend to be very transient. Media are evolving kinds of things that people build. They're not a technology; they're a set of rules that mesh with technology. What happens is that if you have a set of problems, those problems tend to go away. None of the biggest problems we had in 1986 were among the biggest problems that we had in 1988 because all of them got solved. Most of these problems are solved, although these underlying problems probably won't be resolved quickly or at all.

The problems, however, aren't the big deal. If problems are really bad, people simply won't use the media. That's what happens when you have severe problems. What's really important is the benefits, and the extent to which they outweigh the costs. Rather than going through that, let's work through some of these benefits in terms of what people have said.

One of the biggest impacts of conferencing has been the software databases that I talked about. (Text projected on screen:) "I just had the terrible occasion to use Dave Mitchell's UNERASE program on PCTOOLS. Terrible because I had a real need to use it, not because of the program itself, which is actually quite usable, and fit my needs perfectly. Now thanks to Dave and thanks to IBMPC (where I found out about the program), I have recovered at least two weeks of my work." This particular individual messed up his hard disk by accidentally erasing a program, and accessed IBMPC, asked about it, found out about this program, used it and was able to recover his files. The net result: saved productivity for this individual. He is really big on IBMPC because it saved his life. Similar kinds of things happen with all sorts of tools. If you need something and you find that it's already there, you are ahead because you haven't had to write it.

Online support: (text on screen:) "One of the things that amazes me about this conferencing disk is the willingness of contributors to provide programs, information, etc., and then to make changes to satisfy a user. If the price I have to pay for this kind of service is to provide some testing and info on any problems, it's by far the best deal I've ever seen." A lot of people feel that way. One of the things we're beginning to explore is how IBM can begin to take this out to IBM's customers. That is, if we've got all of this good stuff inside that's helping all of us, wouldn't it be nice if we could take all of this good stuff outside so it could help all of them. We're working heavily on that right now. We may even start to do that by the end of the year with at least one customer using a system that I have a copy of with me.

Timely access to information: This is one that might really matter to you folks in Alaska. I note that one thing that we have in common between IBM and Alaska is that we have a large number of small branch offices distributed all over the world. One of the problems that we have had for the entire history of the company is how do you tie all these people at all these little branch offices into the core? How do you communicate with them, and how do they communicate with you?

A lot of people at a lot of small branch offices have felt very isolated from IBM throughout IBM's history. This guy in Finland is expressing that. I've been to Finland; the Finland branch office has about 15 people. The point is, "Living in Finland, a sparsely-populated country rather far away from development and support centers, often creates a lack of information. IBMPC greatly helps in this situation by providing timely information, source of useful tools, exchange of experience and solutions to problems." The point is that conferencing is providing a way to tie a lot of people in a lot of different places together using in effect a low-bandwidth, relatively low-cost solution to distribution.

A lot of people make a big deal out of fancy, sexy technologies like videoconferencing as solutions to distributed problems. They potentially are gigantic solutions; I don't want to say that they're not. The fact is that we have a videoconference network in parallel with our computer conference network at IBM. Now my computer conference is run by one person, one headcount, and it happens that I also do other things like design OS2 software. As a matter of fact that's my job. Running computer conferencing is kind of an overburdening sideline.

At the end of my hall we have a videoconference room. The videoconference room at my site has one full-time person there all the time. And every other site has another full-time person there all the time to run the videoconference room. That person has a backup so they can take vacations. At least at my site there's a support person who actually knows how to do the things. The point is that, just on personnel costs, the cost of the videoconference network at IBM is probably a hundred times the cost of our computer conferencing system.

Then there's hardware. The cost of the hardware is the gadget we put things on. Right now IBMPC is about 200 megs, which at current prices is about a $1,000 hard disk on a PC. So gadgetry isn't the major cost. The network's overhead sits there no matter what; so it's only the personnel cost. But the video room we upgrade every 18 months at a cost of a half a million dollars. We must do the same thing with all the other video rooms as well, so it's a very expensive technology relative to this one. But we've got 25,000 contributors, and they maybe have 5,000 users over the same period. That's a real big difference.

You don't want to overstate what computer conferencing gives you, because it's a low-bandwidth solution; but you don't want to underestimate it either, because low-bandwidth solutions can do a lot for people. This is an example of what I said before (overhead slide): "From the Netherlands: About 1340 local time I fired off a request to IBMPC for a copy of a document not readily available locally. At 1510 I had an acknowledgement from YKTVM that my append had been actioned and at 1513 the first copy of the document hit my reader followed within a few minutes by another response. Within an hour and a half a request originating in the Netherlands had been answered from the U.S. and the document was in my possession without me leaving my desk." He asked for a document; an hour later, without leaving his desk, he got it.

A database of information. The stuff you put on IBMPC stays there for at least a year. Now that's in contrast to UseNet where things disappear after two weeks. We keep it up for at least a year; in fact we have an archive of everything that anybody wrote on IBMPC for the last 10 years that's accessible on the network. So it's a database of everything everybody ever wrote about IBMPC on IBMPC for the last 10 years. It's a database of information that's very accessible. In fact, some folks in Lexington have put together an index database that people can send queries to and say, "Where can I find this mix of keywords?" They'll tell you which ones and where.

Productivity. In this particular case a user in Rome reports that IBMPC turned the PC from a good machine like many of them to the greatest technical experience of his life -- "the first time we've felt as up-to-date on things as our colleagues in the States." A lot of people on IBM felt that they were on the downside of their career, at the end of their learning path, and IBMPC came along and gave them a whole new lease on their careers.

Customer support. This is an interesting one. The customer had a wide electronic-manufacturing experience suitable for this difficulty in installing an XMA and 1M add-on. He had read a book, made many tech phone calls, and to no avail. "Because of the IBMPC conference, I was able to reach out well beyond the normal support structure and help a struggling customer. His reaction, beyond being thrilled that his problem was behind him, was to to say, 'I had no idea your people could get through to your engineers so easily; no one else does.'" Think about that in education: I had no idea I could get through to your expert on this topic so easily; no other school system can.

Product development. Literally developing products through IBMPC these days, and literally have developed a new software development process as a result of the way we have worked there. The way we're developing OS2 is completely different than the way we developed any operating system or piece of software in the history of IBM. Basically what we've done is we've taken the principles of IBMPC and applied it to that process. We've taken large numbers of people, broken them up into small groups, and said, "You own this little piece. Take your piece, de-bug it online, and bring us a bug-free piece that we can plug into the system." That's how it's being developed. Exactly the way we do our normal development on IBMPC. It runs on OS2. I have a casual bias — it is really the best operating system I've ever used.

Morale. "I must applaud the append reference to employee morale. I think in the long run this has been one of the more significant benefits. Out of 25 years of Big Blue, although people kid about the old days, the songbooks, etc., what can't be denied is IBM had an *esprit de corps* that was second to none and the envy of most. I thought that the changes over the last 10 years had eliminated much of that, but IBMPC is a significant factor in restoring my own morale." Most of it is we put them in contact with all the other people who are doing things in the company. The problem is that when you have a large number of people, the one thing that goes away a lot of time is peer-to-peer contact. The only way you can talk to someone in Finland from Yorktown would be to go through your manager and your manager and your manager, and then his manager's manager, and then back down and back across. At IBMPC I can find him without having to do that.

To be a One Performer. This is an executive's assessment, but basically what he's saying here is he ended by asking his students if they knew what it took to get a "one" performance rating. His answer — one performers knew their job thoroughly; they also knew everyone else's job in the department and what's happening on the site. And he said they all belong to an exclusive club within IBM. When asked what that club was, the (answer was the) IBMPC computer conferencing facility. Now that may have been an overstatement, but the point is that people who have participated there have tended to become much more productive, and better connected as a result of being there.

And now to the light side. "Now all unwittingly and as a byproduct of activities that are thoroughly justified on many other grounds, you've invented the ultimate employee tie, the intercontinental coffeebreak. Sure it enhances our productivity and all that, but also it's fun." And that's the thing. Most of the people I know who have tried computer conferencing, and use it, enjoy it.

I could not get my wife interested in computers until I got her on Prodigy. What happened when she got on Prodigy — and people can talk one way or the other about whether Prodigy is observing free speech and all of that stuff — the fact is that what my wife does is she gets up, she reads the soap opera digest, she checks the weather, and she gets up on the conferences and she talks to other people through them. And it gives her a level of contact that, especially in today's world — we live in a neighborhood where almost all the other mothers work — she gets contact with other people to a greater extent than she did otherwise.

One of the interesting things about the computer revolution and computer conferencing and communications is the number of people I know who met their mate talking on a computer conference. It changes the whole dynamics — you get to know a person intellectually before you meet them. Very interesting kind of change in social dynamics.

And again, in my 21 years at IBM, I think conferencing is my most important accomplishment. Why do I think this? It allows me to talk to the world, to listen to the world, to communicate with the world. That ultimately is what conferencing is all about. Conferencing is all about large numbers of people sharing information together.

McKAY: Let's get in a couple of questions.

DEAN GOTTEHRER: Are most of these forums moderated or not moderated?

FOULGER: Our forums are entirely un-moderated.

GOTTEHRER: Do you have any moderated forums?

FOULGER: We have no moderated forums in the sense that I believe "moderating" means that things are submitted first and approved before they go out. That's what moderating generally means on UseNet. We have no moderated forums at all. Everything is as you punched it and we make the judgment after the fact. In fact, it is the case that people can put the most inflammatory stuff up there and what will happen is that we will delete it after the fact because it doesn't conform to the rules, rather than worrying about it beforehand. The key reason for this is that there's a key dynamic in computer conferencing that you lose as soon as you moderate — and that is the interactiveness. If it takes too long for the message to get through because somebody's asleep or out to a picnic, or whatever the reason; that interaction is lost. It's particularly important for us because we get contributions around the clock. There's a slow period while the sun is crossing the Pacific — just after San Jose goes down, and before Japan comes up. But of the 2,000 appends a day I get right now, 800 come from Europe, starting about three in the morning. And much of the rest comes from the United States up to about midnight, but Australia kicks in in the middle. It's around the clock. We couldn't run the way we need to run. Someone in Australia couldn't get an instant answer if they had to wait for someone in the U.S. to approve their append before going on.

GOTTEHRER: My experience on UseNet is that some forums are better run moderated, depending on the kind of forum, the number of people, the topics of discussion. You eliminate duplication. If you're going nowhere and getting there quickly, it stops that. And others are better run unmoderated. Especially the question and answer forum, there's no need really to moderate that.

FOULGER: This is where the real difference comes in, in terms of the way we have shadows and the way we have rules, and those are two things that differentiate us from UseNet in a big way. Every shadow of IBMPC is a complete copy of the whole year. UseNet conferences at most hold two weeks; shadows often only count in days. Our stuff is all in a file with reference information such that you can jump back and forth easily. On UseNet, you don't have that kind of control. In fact in general most people read things through their mailbox on UseNet. We tend to have specialized conferencing tools that most people use. Which isn't to say that people don't use their mailbox; they can, and some do, masochistic though they may be.

The point is that because of the way we organize things, when a deletion happens, people can see it on our system; they cannot see it on UseNet. There's something left; there's a shell; if they've read it already they know why it was deleted. The second thing is we have a set of formal rules. The formal rules are posted and known and decided. People who believe that certain kinds of language don't belong on IBMPC are glad those rules are there, because it protects them. Now maybe that restricts somebody's expression, and certainly they think that if you delete them. And maybe it doesn't. Maybe the English language is rich enough that you can find almost a thousand ways to express anything. But regardless of that, we tend not to have the kinds of problems that lead to moderation.

HERBERT DORDICK: I think you rushed over too quickly the Prodigy issue. I think it may become a real problem in the future, on these so-called public networks like Prodigy or CompuServe. That's the free-speech question, or the protection of free speech. I think it becomes a real interesting question when you get to the notion of networks for teachers to interchange ideas, which I think is very, very important, and very valuable. The question is: Is that a public network, since it's going to involve thousands of teachers on the network; is it a private network — what free speech protection do the teachers have? Let's say we have a conferencing system for state officials and local officials in Alaska. Do people on it have free speech? Can they be tracked? Will the whistleblower effect enter in? Those are the kinds of issues that need to be dealt with and cannot be quickly overlooked. IBM can get away with that; it's a private company, it's not a public network.

FOULGER: But it's more than that. I would assert that we don't really impinge on free speech at IBM. I would assert that strongly. I think this is one key point where you have to look at the intersection. Computer conferencing is not strictly an interpersonal medium; it's a mass medium. In mass media you have editorial policies, and lots of competing journals, and magazines and newspapers, each with different editorial policies, each with different focuses, and each with different ways of deciding whether or not something is in the rules. The fact that I say that something doesn't belong on IBMPC, or Prodigy says that something doesn't belong on a particular one of its bulletin boards doesn't mean that free speech has been impinged on, if it's treated as an editorial policy issue. The person still has easy and widespread ways of expressing opinions through other channels. In fact, all of those things obtain. Anybody who doesn't say something on IBMPC could try to do it on Prodigy, and if they failed on Prodigy, they could do it on any one of hundreds of thousands of bulletin boards.

DORDICK: The audience that person wants to reach is different. In fact, in a case like that right now, there's a SeniorNet which is meant for retired people on the Network. Apparently one participant on SeniorNet had some sexually suggestive comments, and the manager of SeniorNet tried to block them. There was a big hullaballoo about that person's free speech rights, and the person so far hasn't been able to block it, but it'll go to the courts. The courts won't touch it for a while because it's a very difficult issue. But if we're serious about the computer becoming as valuable an interactive medium as the telephone, then these are the kinds of issues that the courts will have to face, if we still believe that this country does in fact have a first amendment.

FOULGER: Is SeniorNet a bulletin board, in effect, or a network of bulletin boards?

DORDICK: It's a network of bulletin boards.

FOULGER: My view is that a network shouldn't have a policy. A network is a common carrier. Boards on the network have the right to make an editorial policy.

Thank you very much.

'I think it's critical that we have a real presence in the area of telecommunications'

Wayne Miller,

in his second year as dean of the College of Arts and Sciences at the University of Alaska Anchorage, previously was dean of the School of Human Sciences at the University of Houston-Clear Lake. He is a former director of telecommunications at the University of Cincinnati, has been a writer and a producer for the Public Broadcasting Corp., and is the author of eight books that examine the United States as a multi-cultural society.

I think the primary role for an administrator is to be brief. And I'll certainly be that this morning if you'll permit me to be. Being the dean of a college that's really just been put together in the last three or four years has been a series of ups and downs. In the last two weeks, the external good news was that the Ford Foundation is extraordinarily interested in this campus, UAA, as a place to bring its multi-cultural interests. A team from AASCU is going to be here during the next week to advise us concerning ways to transform this campus — I think that's extraordinarily important for us. Some other good news is that last Friday we found out that we had received what's called the University Affiliated Program, which is funded to help the developmentally disabled. It's $290,000 a year to fund the administration of it, do all the applied research, applied activity. The average University Affiliated Program at other universities generates $3 million to $5 million a year in research grants. So those two items were the external good news.

I think it would be incredibly dishonest of me to stand here and not acknowledge what I'm sure you all know — that the bad news has been that the Center for Information Technology, at least as we look toward FY93, will be phased out by the end of this year. Now that I've said it, let me back up and try to place that in a larger context. When I came here as dean of the College of Arts and Sciences, it was neither the highest-paying choice, nor the highest-ranking choice I had when I decided to come to Alaska. I thought then and I do now that this city is a place where extraordinary things can happen in terms of the university and its relationship with the city. One of the things that people have to bear in mind is that if you take out the K-through-12 quadrant — people in the school district, the kids — if you take that out of the total population of the city, then you look at the number of people that the University of Alaska Anchorage serves here, it's about 10 to 11 percent of the total population that we serve directly. It's extraordinary. This university ought to be at the very center of this city's development, and I think it can be.

When I announced the program for the plan for the College, which I take very seriously — you know academics are usually very good at drawing up six-year plans with little reference to previous efforts; it's time for the next six-year plan — I keep bringing up this plan and I use it at almost every meeting we have. It strikes me that we ought to be emphasizing undergraduate education and applied research in a number of areas. The University Affiliated Program, in the area of psychology and social work, is clearly that kind of program. The Center for Information Technology could clearly become, or might become, the center of applied research in the area of telecommunications, and all that that suggests these days. I think that the future of the kind of work Larry has been doing has not disappeared. I think it's critical that we have a real presence in the area of telecommunications; I think it's critical that we have a real presence in the area of how the university can relate to the city and the state in that regard.

If indeed the budget crunch forces first the diminishing of the structured activity, it certainly is my intention to work with Larry as much as possible to continue the activities, and hopefully develop the kind of one or two large grants, like the federally-received money at this point for the UAP, that would trigger both continued activity, and then, I hope, growth of the university's reach for your interest both in the city and the state. I think we can do that. You have a good person in Larry; he's not going to be disappearing. The Center will continue through this year on a very diminished administrative basis. And we have some pretty good prospects I think of developing the kinds of grants that we think will go. And of course that does not preclude further university and state funding later. It's not what you want to hear I know. You'd like me to be able to say that we have on hand $2 million for the Center; maybe next time we meet we'll be able to say we have $500,000 for the Center in external grants. We certainly will be working toward that. There is lots of room for contracts out of a Center like this. Even in its final year under its present construction perhaps we'll develop some of those as well. That was the unhappy part — I'm very, very unhappy about this, but we put these things together as best we can.

It's my happy task to introduce to you today the president of the University of Alaska. If you've been reading the papers, I suppose you know that the system is developing a way of distributing its funding — there's a 10-year model involved — and there are activities that remind me both of New York and Texas where I've taught and where there was a formula. I'll tell a little story. When I first went to the University of Houston-Clear Lake, I was told that the School of Business generated enormous amounts of money for the institution and that the Humanities, Human Sciences and Fine Arts had been losing money. And there was a formula in Texas where each semester hour by a given school generated a certain amount of money for funding. At least that was the idea. And so I asked the president if we could do a P&L on how the school actually operated, what the bottom line was. That first year, the School of Business lost $767,000, and the little School of Human Sciences, Humanities and Fine Arts generated an income of $320,000. So the ways of university finances are always interesting, and the clichés and accepted beliefs are not usually true.

We have a president who is bringing great leadership to this university, and we certainly welcome him. At the chancellor's meeting the other day he said the regents made very clear that the line officers for this institution would be responsible for their domains — the president and the chancellors. And that the staff people would not sort of have their own fiefdoms as they run around. We all know that, in any system, if line officers are not responsible for their domains, we're in serious trouble. I think we have someone who's bringing great leadership to the system — Jerry Komisar.

'The old familiar landmarks seem to be disappearing'

Jerome Komisar

is president of the University of Alaska. He came to Alaska in 1990 after 20 years as an administrator with the State University of New York (SUNY). At the time he left the SUNY system he was executive vice chancellor and president of the Research Foundation.

Can I stand up here for support? After the announcement of disappearing resources, I may need this for protection. I'm very pleased to be here and have an opportunity to welcome you to a conference that's already begun — and I hear that it began well, so that the welcome really comes after the fact. I was going to hold exclusively to a discussion on communications — the little I know about it. But after Wayne's comments — not only about the University of Alaska and the model that we're developing for the allocation of resources, but the discussion of the Texas system, and profit and loss statements — I thought about an old anecdote that comes out of the Hollywood of the silent movie when there was a pattern, almost a necessity, for every comedy that was produced to have a scene where someone slips on a banana peel.

There was a young director who was trying to perfect this scene and make it better than it had ever been done before. And he kept diagramming how he would approach this, and he showed the banana first, and then the pedestrian walking down Park Avenue. Should he show the pedestrian first and then the banana peel, keeping them both in the frame at the same time? How would the slip on the banana peel work? He'd been contemplating this for days. When the fall was ready to take place, he bumped into Charlie

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Chaplin and he raised this question with him. He said, "I have this scene coming up, and I visualize first the pedestrian and then the banana peel, or should I use the reverse — how do I approach this?" And Charlie Chaplin said, "No, don't do any of those things. Show the banana peel and the pedestrian, and the pedestrian is walking slowly down towards this vehicle of homicide. Have the pedestrian step gingerly over the banana peel without falling, and then have him fall down a manhole."

I sometimes get the feeling in university administration that we step lightly over the banana peel, and we don't watch the manholes, and that's an extraordinary danger. I'd like to think that we are looking far enough in front of us so that we can avoid all obstacles that might trip us on the path.

'Our world is being designed and invented in multitudes of locations all around the globe.'

I must say, the topic that you're taking up today is one of enormous consequences to the university and to the world in general. I like your title,"Finding Our Way in the Communication Age," it sort of carries a sense that I feel most of the time that all of us are a little lost as we muddle through this final decade of this century. I sometimes feel a lot lost. The old familiar landmarks seem to be disappearing, and we're going to have to develop some new ones.

Last night I had an opportunity to talk briefly to people attending a meeting at the World Trade Center with the Center for International Business at the University of Alaska Anchorage. Behind me was this wonderful map of the world. It was the kind of map that most of us are familiar with, or at least we're getting familiar with, where two-thirds of it is above the equator, and one-third is below — you always have some distortions in maps. The difference between that map and the map of my childhood was the center and focus was the North Pacific, rather than having the United States in the center, and the rest of the world reaching out from that.

It reminded me of being at a conference not too long ago where we had a number of foreign visitors, including one from Australia who was describing their new map which had Australia right in the center of the map and the world circling around Australia. Then there was a representative from Thailand, from Chulalonghorn University, and he said that they were fooling around with a map that had Thailand in the center of a flat space, and the world spinning around Thailand. And I said, "Of course, the only map you should have is one with Alaska right in the center, and the rest of the world going around it." That is the appropriate visualization that is taking place on the planet.

The interesting thing about this map that was behind me — two observations: one, that it was out of date, if not in terms of the land shapes, in terms of the titles and names of the countries. In fact, if you look at the ubiquitous catalogs with Christmas presents this year, all of those that are selling globes are selling globes that by the time you purchase them and they arrive as gifts, will be out of date. The world is just changing so rapidly that mapmakers, particularly those that are conscious of political design, just can't keep up.

I think that the more interesting observation of any map goes back to an old question from economic history. It was a question when students studied economic history both in this country and abroad, the economic history of any nation — the question was the search for the concertmaster. What element within the society was leading the economy?

In the socialist philosophy, the leadership would take place in some office where you had a group of planners that sat around and could design the future. In a market economy, you didn't have that type of dynamics so the historians really had to look. Could you find the concertmaster in the building of the railroads in the nineteenth century? Do you find the concertmaster in the banking industry in Manhattan at the turn of the century, or Carnegie putting together enormous companies, the capital for great adventures? Whoever or whatever the concertmasters were in the past, when you look at a map today, you'll know that you cannot find a single concertmaster.

In fact the world is being designed and invented for us. Our world is being invented in multitudes of locations all around the globe, in city after city, in country after country. If we're going to make any sense of this, if we're going to keep any order, if we're going to be able to survive the process, and not just muddle through it, we're going to have to be able to keep in touch with one another, to be able to communicate with one another, to be able to instruct one another in at least the foundations and the basics of the current society.

So I very much envy your knowledge; I envy your task, and I envy the fact that people in your discipline, who are looking at how the world connects with itself, are going to be among those of the greatest service in the next century.

Thank you very much.

The Social and Political Contradictions of the Information Age

Herbert Dordick,
an electrical engineer, is professor of communications at Temple University in Philadelphia. He was a consultant on President Johnson's Task Force on Communications Policy, was the first director of New York City's Office of Telecommunications, and was a senior member of the RAND Corp. research staff. He has worked with the FCC and has been a frequent consultant to federal, state and local governments. He is the author, co-author or editor of 10 books.

One can approach the study of the "information society" (the "post-industrial society," the "informationalized society," the "communications revolution" and more) by devising a theory or set of theories to explain the emergence of the era to assist us to understand current developments and possibly forecast future developments in the evolution of this society.

Or one can describe what is taking place, forecasting new technologies, new applications and new individual and societal behaviors. Too often this "futures" approach leads to descriptions that support commercial marketing campaigns and promote technology. Many academicians have stubbed their toes engaging in this practice, coming off as shills for the major telecommunications and information technology firms as they forecast great profits and astounding social and political changes.

Or one can examine the economic, social and political consequences of this societal change empirically drawing upon what we know, not what can be or should be or might be. If done honestly and well, we could learn something about what the future holds in store for us and guide us toward the more effective, indeed, humane uses for information technology. This is my task this morning.

We have been told that telecommunications will allow us to work at home in electronic cottages and that firms will become footloose using the flexibility of information systems and the speed of the information transportation network to free themselves from geography. We have been told that people will no longer need to crowd into inner cities to work but can stay at home in pleasant suburban and rural locations surrounded by a virtual reality of sound and images.

We have been told that society was to be a cashless and checkless one; that there will be schools without walls in which students will be reached by the great minds of the age without these minds being in the presence of the students. And that the information age will offer the right information at the right time and at the right cost to everyone. Knowledge and, perhaps, even wisdom will flourish in this new era of information and communications plenty.

We have been told that the hierarchical structure of firms will disappear and in its place there will be cooperative structure in which power will be distributed to all. We have been told that the lesser developed countries will leap across the industrial revolution and into the information age, thereby avoiding the terrors of industrializing and painlessly acquire the benefits of the information society. Small and medium size firms will flourish as information technology gives them the ability to compete world wide against large firms. Small will be beautiful and profitable providing customer specialized products and services to all at reasonable costs.

We have been promised an era in which information and knowledge rather than material values will be the driving forces, and growth in human productivity will require a redefinition of work, and our greatest problem will be how to make our lives more fulfilling without the tedium of a 9 to 5 job.

None of these prophecies has stood up to observation. There are some examples of distance education that seem to work, at least for short periods, and of professors, consultants and other self-employed persons working at home several days a week. But on further analysis we find that these experiments in home-based telework, for that is what they seem to be, do not work as well as advertised, or they are very special cases, unlikely to be repeated. Indeed, distance education appears to result in inordinately large student drop-out rates, in excess of 40 percent in many cases, for reasons having nothing at all to do with the technology but rather with the performance of the teachers and of their administrators.

'Did we really believe that information technology would remake man and re-order society?'

Did we really believe that information technology would remake man and re-order society?

Ourselves and our society are the sum total of our histories, and we cannot simply shed behavior and social structures by switching on new technology. Our economies are complex processes composed of many conflicting forces that somehow manage to work together, not always for the good of all, but aim to maintain political and economic stability and perpetuate the status quo. Even during the upheavals we are seeing in Eastern Europe, there is always the urge to return to the stability with which they are familiar, be it a monarchy, a new tyranny, or a form of democratic government that nevertheless is not too different from their past. People are like that.

We cannot forget that the information and communication "revolutions" have taken place in a world of political, economic and social realities, the proverbial "real world." Information technology (and I include telecommunications) is a tool for these forces to be used to achieve political, social and economic goals. So it should come as no surprise that we are shaping a world that is not too different from the world we have known, the era we called the industrial revolution. We get the technology we need in order to achieve the goals we set for ourselves, and if these goals come out of the Enlightenment as interpreted by devout capitalists or interpreted by humane Marxists as Social Democracy or even the few hard-line Marxists clinging to their command economies, the outcome is determined — not by technology — but by our social, political and economic goals. Therein lie the reasons for the many contradictions of the Information Age, three of which I shall discuss this morning.

It is not a coincidence that the information society and the global economy burst forth upon the public consciousness at about the same time. In 1963, Tadao Umesao suggested ["On Information Industries," Asahi Broadcasting, January 1963] that following the agricultural and industrial eras, a third era was emerging based upon the production and utilization of information. In that same year Fritz Machlup put forth the notion that the production and distribution of knowledge made a significant contribution to the nation's economy and measured knowledge as an economic factor [in *The Production and Distribution of Knowledge in the United States*, Princeton, N.J.: Princeton University Press, 1962]. While information was essentially overlooked by economic theorists or waved away by the assumption of perfect information, educators, civil servants, professionals, industrialists, farmers, insurance salespersons, stock brokers and, indeed, everyone engaged in performing socially and economically productive transactions knew that information was necessary to their work and had always been so. Consumers, too, understood that without advertising, their shopping chores would be difficult and their political choices even more so.

At the same time (in the 1960s and 1970s), the role of the multinational corporation in the extraordinary growth of international trade and capital flows was recognized by the business community, already engaged in global enterprises. This prompted the United Nations to monitor the growth and influence of the multinational corporation and especially its impact on the lesser developed nations and published the first of many studies on the progress of multinationalism [Michael P. Todaro, *Economic Development in the Third World*, Longman, New York, 1989, pp. 469-474, and *Multinational Corporations in World Development*, New York, United Nations, 1973].

Global economic activity is not a new phenomenon. Following Waterloo, Britons invested overseas as never before; £30 million per year by mid-century growing to over £70 million each year between 1870 and 1875. They reaped considerable benefits from these global investments; £8 million interest per year in the early 19th century to over £50 million per year by the 1870s [Paul Kennedy, *The Rise and Fall of the Great Powers*, New York, Vintage Books, 1989, pp. 156-157]. But the idea of a global economy goes back much further, to ancient and medieval ages.

Fernand Braudel defines a world-economy as "an economically autonomous section of the planet able to provide for most of its own needs, a section to which its internal links and exchanges give a certain organic unity" [Fernand Braudel, *The Perspective of the World, Civilization and Capitalism, 15th-18th Century*, Vol. 3, New York, Harper & Row, 1984, p. 22]. Ancient Greece, Rome and Islam were world-economies. As early as 1500 a European world-economy, with Venice as the dominant capitalist city, reached from the Baltic to Norway and through Middle Eastern ports to the Indian Ocean. By 1775 European trade circled the globe; English, Dutch, Portuguese, Spanish and French trade networks extended from the Old World to the New, to Africa and the Orient. London had become the dominant capitalist city of this world-economy.

The production, distribution and effective utilization of information are necessary for a global economy, for the boundaries of world economies are defined by geography and time, and the instantaneous delivery and exchange of information erases these boundaries with profound impact on the globalization of economies. One might well argue that the inevitable coming of Adam Smith's world-economy in which labor and capital know no national boundaries created the need for better means of communication and coordination necessary to efficiently manage that world economy; hence, information has become a crucial commodity and its rapid transport a necessity.

> **'Firms learned that information technology can perform the coordination and communications tasks . . . of middle managers.'**

Roman roads and Roman laws were essential for the growth and maintenance of their economy, and well-built and fast Venetian ships were the keys to the success of the European world-economy. Geographic limits were created by the lack of roads, by impassable mountains or long desert wastes, or where pirates controlled certain sea routes or denied ships access to ports for provisioning. Nevertheless, communication by messengers and travelers was surprisingly extensive in these years; one is often surprised at the degree to which the knights of the 14th century roamed across Europe and the Middle East seeking plunder while "converting the heathens" and the efficiency with which Italian bankers controlled trade and commerce from London to Constantinople.

If geography created limits to the reach of the global economy, time was a force for maintaining and perpetuating that economy. While information traveled within these ancient economies, as noted by the way prices of commodities and news of bankruptcies and battles were available remarkably quickly at the remote corners of the economy and between world-economies, time scales were long, measured in years and even decades. This tended to perpetuate the life of a world economy, requiring many decades for even a declining one to lose power to a neighboring economy.

With the invention and diffusion of the steam engine, merchant vessels increased their reach and reduced travel time as did the locomotive. The modern era saw the rise of the telegraph and the telephone to further reduce the time it took for disseminating market information and of aircraft to deliver commodities. The boundaries of world-economies expanded.

In modern capitalist societies organizations need to grow for a number of reasons. Perhaps the most important is to prevent takeover by larger firms. Various arguments have been advanced about how growth imperatives result in the transformation of competitive markets into oligopoly or monopoly markets. A major incentive for growth is the ability of the firm to increase relative control over various environments, i.e., suppliers and markets.

Growth comes from a limited number of sources of which the most important are the creation of new markets through marginal advantage from greater efficiencies of production and/or distribution which influence real costs to the firm and mergers, utilizing the existing firm and its capacities to grow larger and thus acquire greater capacity for liquidity, market balance, personnel and talent mix, financial depth, and more.

Some firms grow successfully and others do not, as Chandler has pointed out [A.B. Chandler Jr., *The Visible Hand: Managerial Revolution in American Business*, Cambridge, Mass., Harvard University Press, 1977]. Chandler's case studies have been econometrically expanded by Williamson in his analysis of internal organization, market power and limits to firm size [O.E. Williamson, *Markets, Hierarchies: Analysis and Antitrust Implications*, New York, Free Press, 1975]. These analyses provide additional insights into the reasons for the importance and intense interest in communications and information technology in management, organizational structures and education.

Firms learned that information technology including modern telecommunications can perform the coordination and communications tasks normally performed by large numbers of middle managers and do so very well. Furthermore, as this technology becomes available, firms innovate along non-traditional paths dictated by the information and telecommunications technologies. Traditional industrial innovation occurs along these often well-defined directions: product, process and managerial. The revolutionary nature of the microprocessor is its influence across all of these dimensions, and innovation occurs almost simultaneously. Microprocessor-based innovation as in the information and telecommunications technologies affects what goods and services are produced and how they are produced and, through managerial innovations, strongly influences the nature of the organizations in which they are produced.

With these new technologies and especially with the global telecommunications networks, management can improve its coordination and organization productivity levels far beyond that which Chandler observed in the '50s and '60s. Consequently, firms can internalize more operations and tasks and grow ever larger more efficiently. There are essentially no geographic boundaries limiting their reach nor are there time boundaries, for with information technology and world-wide telecommunications networks, time and space have new meanings.

Adam Smith's vision of a world-economy, in which the invisible hand of the marketplace has been replaced by the very visible hand of the global firm geared to the global economy and the global market, has become real. Indeed, global or multinational firms have, today, annual sales volumes greater than the entire GNPs of the developing nations in which they operate. In 1985, the two largest multinational firms (Exxon and General Motors) each had sales values greater than the GNPs of all the developing nations other than Brazil, China, India, Mexico and Iran. The combined sales of the six largest multinationals exceeded the GNPs of many of the developed nations including Switzerland, Canada, Australia, Belgium, Sweden and Italy.

'If information is the engine of growth, nations will increasingly shift their focus . . . to the production and distribution of ideas.'

In the global marketplace, firms will freely roam the world looking for the most hospitable nations in which to locate their activities, thereby adding jobs, opportunities and a high standard of living to the host country. To attract these roaming firms nations will seek to become an information economy. This economy will be one that has learned how to make the best use of information and has provided the infrastructures, such as telecommunications and education, for making efficient use of that information not only for economic growth but for social and political development as well: in short, an information society.

If information is the engine of growth, nations will increasingly shift their focus from the production and distribution of things to the production and distribution of ideas leading to significant changes in world political and economic structures. Does increasing aggregation of enterprise throughout the world offer another explanation for the emergence of the global economy and with it the demand for information and its rapid and efficient distribution?

James Bryce wrote, "...from the time of Menes down to that of Attila the tendency is generally toward aggregation and this history of the ancient nations shows us, not only an enormous number of petty monarchies and republics swallowed up in the Empire of Rome, but that the Empire itself was far more highly centralized than any preceding one had been. When Roman dominion began to break up the process was reversed and for 700 years or more the centrifugal forces had their own way...From the 13th century onwards the tide begins to set the other way...neither Democracy nor the principle of Nationalities has, on the balance of cases, operated to check the general movement towards aggregation which marks the last two centuries" [Harold A. Innis, *Empire and Communications*, University of Toronto Press, 1972, pp. 9-11].

Innis suggested that media that support time efficiencies would lead to decentralization while media that support space efficiencies would lead to increased aggregation. This suggests that the impermanent electronic media, unlike the papyrus of Egypt and the clay tablets of Babylon, would counter aggregation and lead to decentralization. On the contrary, we find that electronic communications strengthens bonds by centralizing control. Dangers that threaten the world economy are quickly detected and communicated to the concerned players who initiate appropriate corrective measures in order to maintain control, thereby strengthening their global economies.

It is a curious paradox of the information age that the dispersion of consumption is matched by the consolidation of production. Are we entering an era in which relatively few very large global firms will provide most of the products and services the 21st century world will need? Will differentiation among products be determined by modifications in software information rather than modifications in what the customers can see and hold in their hands? Will product differentiation be a challenge to advertisers and public relations staffs rather than designers and engineers? If global firms roam the world seeking highly skilled labor, policies that support economic and political stability, and modern and efficient communication and transportation infrastructures, will that mean the end of national sovereignty?

The notion that low labor costs make for competitiveness is challenged by current thinking about the information society and the global economy. Over time labor costs are likely to equalize throughout the world and, in any case, low cost labor is of relatively little value in a global economy in which high value products and work make for a high standard of living that forms a basis for both the information economy and the global economy.

This is not good news for the developing nations of Africa, Latin America and the Far East. The rapid growth of the information technologies in response to the pressing need of firms to grow, demands for improved mechanisms for the command of global resources, and the demise of command economies that sought to create alternatives to capitalism leave the developing nations further and further behind.

Thus, we encounter our first contradiction. The information era has not led to the formation of an industrial structure that favors the small and varied. The information era has not led to a marketplace that provides for the singular needs of singular people. Rather, the information era has strengthened the capitalistic structures established in the industrial revolution, indeed, has increased their propensity for bigness, and has led to the creation of even larger multinational, global firms often interconnected in the form of financial holding companies capable of controlling the world's markets.

We appear to be progressing to a world in which relatively few very large global firms will provide most of the products and services the 21st century world will need. In this world product and service differentiation will be achieved through perceptions defined and promoted by public relations, marketing and advertising through world-wide media networks. Firms will roam the world seeking least cost labor and maximum return on capital, in order to optimize their value chains. National interests will be subservient to corporate plans and every nation, large and small, will search for an economic niche in the global economy. Nations will have great difficulty monitoring and controlling the flow of money across their borders and, consequently, will have little control over their monetary and economic policies. Sovereignty in a world with weak and porous economic boundaries, and where national interests will compete with corporate strategies, and with ethnic and religious islands of identity, will be quite meaningless.

'When knowledge becomes the engine of growth, there will be necessarily significant social changes.'

The race toward the information society or economy is a rapid one throughout both the highly industrialized and industrializing world and among the developing nations. Nations that cannot participate in the global economy will be distinctly disadvantaged. While these nations were not likely to enter bankruptcy, economic stagnation could lead to dramatic declines in the standard of living, to the loss of economic sovereignty, to unwanted economic dependency, and to ethnic, religious and class strife. This is not good news for the developing nations.

Nora and Minc state that information technology (*telematique*) would accelerate the emergence of a very highly productive society. With "less but more effective work and jobs the changing nature of work would inevitably come questions about the value of work and a wide gulf between those who perform high technology, intellectually challenging work and a non-professional class who will have fewer, lower paying, routine tasks" [Simon Nora & Alain Minc, *The Informatization of Society*, Cambridge, Mass., MIT Press, 1980]. Further, the structures of organizations would necessarily be altered to take advantage of the productivity benefits information and information technology offer as would the roles of managers and management tasks. When knowledge becomes the engine of growth, there will necessarily be significant social changes, comparable to those that took place when agriculture was replaced by manufacturing as the engine of growth.

We noted previously how some firms grow successfully and others do not and how firms quickly learned that information technology including modern telecommunications can perform the coordination and communications tasks normally performed by large numbers of middle managers (information workers). When firms consolidated into larger firms, or were forced by competition to save money or by court decision to reduce market power, the first to lose jobs were middle level managers and other information workers. AT&T laid off more than 25,000 middle level managers, IBM reduced its managerial staff by more than 15,000 and DuPont followed suit by eliminating about 8,000 information jobs.

Our second contradiction: The information technologies were supposed to destroy entry level jobs, to create massive unemployment among blue-collar workers. Instead the information technologies eliminated white-collar middle management; the blue-collar jobs and the entry level jobs disappeared long before the information society flowered. It is unlikely that the unemployed information workers will return to their jobs or even to similar jobs when the nation recovers from the recession. Perhaps this is the way in which service sector and managerial productivity will improve, and this leads me to the third of the three contradictions I discuss this morning.

"Informatization" has emerged as a useful concept for examining information societies. Three dimensions of informatization have been defined: 1) the people dimension such as literacy rate, percent of population attending tertiary schools; 2) the infrastructure dimension including mass media, telecommunications, computers and computer utilization by organizations and expenditures for other information technologies; and 3) the economic dimension including the share of the nation's GNP provided by the primary information sector and the number of information workers in the labor force.

Nations have counted the number of telephones or telephone main lines per capita, computers and telex terminals and databases in use, television and radio receivers, facsimiles and VCRs. They have defined a sort of Engels Ratio, the ratio of personal expenditures for information and information machines to GNP per capita, as a measure of their status in the world as information societies, and they have counted the number of information workers in their economy.

But, as Robert Solow remarked, "You can see the computer age everywhere but in the productivity statistics."

Simply measuring information workers may not be an indication of the progress a nation has made towards becoming an information economy. Israel and Egypt, for example, have almost identical information sectors, yet the GNP per capita in Israel is several times greater than that in Egypt. It's what these information workers do that counts. Egypt is a poor nation and many of its information workers are employed in the government bureaucracy as the employer of last resort to provide health and welfare services to the poor. Israel uses its information workforce more productively, in research and development and in manufacturing among other activities.

The contribution of the information sector to the Gross National Product is an important indicator of the importance of information and information technology to the nation's economy. Jussawalla and her colleagues have contributed significantly to this analysis [Meheroo Jussawalla, Donald M. Lamberton and Neil D. Karunaratne, *The Cost of Thinking*, Norwood, N.J., Ablex Publishing Corp., 1988]. They have shown that the information sector in industrialized and industrializing nations contributes an increasing percentage to the nation's GNP and, in Japan, Kuriyama and Oniki state that were it not for information and information sector including the manufacture of information technologies, the GNP of the Japanese economy today would be smaller by about 12% [Tadashi Kuriyama and Hajime Oniki, "New Information Technology and the Growth of the Japanese Economy," paper presented at the International Conference on Asia's Experience in Information, Taipei, Taiwan, May 9-11, 1989].

'Worker productivity may start decreasing once the information sector moves above 50% of the labor force.'

We suggest another important indicator of the state of a nation's informatization: the contribution the information sector makes to productivity in manufacturing and in the provision of services.

Up to a point growth of the information sector should result in increases in labor productivity in the manufacturing sector. Further, the information sector appears to grow twice as fast as the manufacturing sector. Jean Voge reminds us that C.N. Parkinson noted this "square law" phenomenon in large administrations and suggests that Parkinson's findings may also be true for the relationship between the growth of the information sector and growth of a nation's GNP. He goes on to suggest that this would lead to a leveling off of productivity gains with increases in the information labor force. For example, he argues that worker productivity measured in constant dollars per worker stops rising once the information sector reaches 40 percent and may start decreasing above 50 percent. The reason for this is that productivity gains from modernization of facilities are insufficient to offset the accompanying increase in training, research and administration costs [Jean Voge, "Crisis, Information and Communications in the United States Economy," InterMedia, May 1985, London].

We have extended and further quantified this relationship between manufacturing productivity growth and information sector growth for the United States, Japan and several of the ASEAN nations.

In the United States there has been a slight decline in manufacturing sector productivity from 1980 through 1988, while the information sector moved up from about 47 percent to almost 54 percent of the work force.

On the other hand, from 1982 onward the Japanese information sector has increased only marginally, yet there has been a dramatic increase in manufacturing productivity, especially in the years 1985 through 1988. Korea shows results that are similar to that for Japan, modest growth in the information sector between 1985 and 1988 but a significant increase in manufacturing productivity, especially during the years 1987-1988. Singapore exhibits a pattern that mildly parallels the Japanese experience — modest growth in the information sector and relatively large growth in the productivity of the manufacturing sector. In these nations the percentage of the labor force in the information sector is less than 50 percent.

After a drop in manufacturing productivity while the information sector was growing between 1980 and 1982, Thailand has shown a modest rise in this productivity despite almost no growth in the information sector. This could be explained by an early investment in information workers for government and social service activities between the years 1980 through 1982; as social conditions improved between 1982 and 1988, these workers were, then, available to industry.

Malaysia exhibits stagnant growth in the information sector as well as in the productivity of the manufacturing sector. Why this is so is not clear although we know that Malaysia has established an automobile industry using imported Japanese engines and other parts, assembling vehicles in Malaysia. Thus, the high valued information work is performed in Japan while the less intensive information assembly work is performed in Malaysia.

Finally, Indonesia and the Philippines show dramatic declines in manufacturing productivity, while the information sectors have been increasing. This may very well be another case in which the information sector is primarily engaged in government and social service activities. In the Philippines the period between 1982 and 1985 shows a very rapid decline in manufacturing productivity which may very well be the consequence of political and economic turmoil during the excesses of the Marcos regime.

We should point out that our analysis is highly aggregated. A more accurate determination of the contribution of information and information labor can only be achieved through case by case analysis of specific firms or industries.

Observers of contemporary economic trends are perplexed by the rapidity of technological changes and the relatively slow gains in productivity. In particular this has been evident in the dramatic developments in information technology which have not appeared in the economic statistics of productivity. Paul David points out that this is not a new phenomenon and that in 1900 observers may very well have said that electric dynamos were to be seen "everywhere but in the economic statistics" [Paul A. David, "Computer and Dynamo: The Modern Productivity Paradox in an Not-Too-Distant Mirror," CEPR Publication No. 172, Stanford, Calif., Stanford University, 1989, p. 2]. An OECD study confirms that industrialized countries have often built up unequaled scientific and technological capacity, and while technological change seems pervasive in everyday life, these countries appear to be finding it increasingly difficult to translate this capacity into measurable productivity increases [OECD:CSTP Programme, 1989, p.1].

'The third contradiction is that productivity has not increased as nations have informatized.'

Many observers have remarked that the boom in office automation, using data processing equipment and the rise of computer intensity of the service industries — especially banking, finance and insurance, wholesale and retail trade — have not been accompanied by increases in indices in output per man-hour in these activities.

The third contradiction, then, is that productivity has not increased as nations have informatized.

Modern telecommunications and information technology, it is argued, have given birth to a successor to the industrial revolution that emerged from England in the 18th century. We are told that we are witnessing the dawn of a new age, the information age, and that this new age is characterized by the emergence of a world economy knit together by wire and radio telecommunications.

Perhaps we are not in a new age but rather in the natural evolution of the industrial revolution and that this emphasis on technology as the *deus ex machina* distorts the role of technology, and distracts us from the important changes our society is undergoing and about which we should be concerned so that we may avoid the errors made in the early years of the industrial revolution.

The contradictions we have discussed and the many others that have emerged as we have sought the holy grail of informatization should teach us several important lessons, some points of which we now discuss.

Capital investments in information technology and modern telecommunications cannot lead to increased productivity unless there are equivalent and often greater investments in education and training. Firms and governments experience long delays between the acquisition of the technology and when expected productivity gains materialize, primarily because of the need to train employees not only to use the systems but to adapt these systems to specific tasks.

Too often there is a rush to construct new telecommunications networks to provide a special service, for example, a voice and data network for government agencies. In most states telecommunications networks already serve government centers and reach into government agencies, but they are not efficiently used. Before embarking on the construction of a specialized network, owned and managed by government, how the existing facilities can be adapted to serve government agencies should be examined. Generally these networks have sufficient flexibility for relatively rapid application to a special service use, especially if suitable tariffing arrangements can be negotiated. In this era of more liberal regulation, this might not be too difficult and would certainly save money. Additionally, incentives to users to use the existing networks should be provided with, perhaps, attractive rates. In this way, specialized voice and data networks for educators which some have argued would be of considerable benefit to teachers especially in sparsely populated states such as Alaska could be provided using existing services.

Information by itself does not create knowledge nor increase productivity. Only when an educated and trained person utilizes this information can knowledge be produced and with that knowledge productivity. The pressure of an increasingly competitive national and world economy drains workers away from rural areas and small towns to cities, leaving these towns barren of economic growth. Yet information technology and telecommunications are widely available in these areas. What is not available is the knowledge of how best to use information and information technology to grow and enhance business opportunities. This situation is quite similar to that which the farmers encountered in the late 19th century prior to the establishment of the Agriculture Extension Service.

We suggest that we need a Technology Extension Service to provide assistance to rural and small town entrepreneurs who wish to enter the information economy. Indeed, this same service might well be made available throughout the nation to assist small and medium size businesses to more rapidly enter the information economy. For we have learned that the small and medium size firms are often the major source of economic growth and employment in the United States. The pull of consolidation and agglomeration taking place throughout the nation and the world has not led to economic growth in the United States nor towards full employment. We need to revitalize the small and medium size business sector of our economy, and the Technology Extension Service is an appropriate step toward this goal.

Broadcasting as a Tool for Social Change

This is a special occasion for me for a couple of reasons. The first is that although I'm used to speaking about many issues publicly, I rarely speak about them in public. That's because most of the time I consider what I have to say, I write it down and I read it into a tape recorder and it goes out over the air to thousands of listeners. So this is almost the first time in more than ten years that I have talked about an issue to an audience I can see. I like the anonymity of radio and I must confess to being a little nervous so I hope you'll bear with me.

The second reason that this is a special occasion for me is that I have been asked to speak about "development broadcasting." I greatly appreciate this opportunity because this is a subject that I care very deeply about and I rarely get a chance to talk about it.

The point of my presentation today is to have some of my enthusiasm and emotional attachment for this subject rub off on you. I hope that enough of you become intrigued by the idea that you will do something to somehow bring it into existence in this corner of the world.

By now you're probably wondering what the heck I mean by the term "development broadcasting."

It probably means nothing to most of you. It definitely means many different things to many different people overseas. And to me, it means a very specific thing that I can define in just two words.

I will give you that definition and I will give you a crash course in how to produce it in a minute, but first I want to tell you the story of how I came up with my definition.

The first time I heard the term was in 1987. At the time I was working as a free-lance journalist in Ottawa. I was also doing some work on the side as a trainer for the Canadian Broadcasting Corporation and for various Native radio stations in Canada.

One day I got a call from an international development agency based in Toronto. I'd never heard of this outfit before but this fellow called me up and asked if I would be interested in training broadcasters in Asia in the field of development broadcasting. I told him I was interested in going to Asia but I didn't know what he meant by "development broadcasting." So he explained it by talking about the project.

He said it was financed by the Government of Canada, was supervised by the agency in Toronto; was managed by an international development broadcasting agency in Malaysia; was mandated by a dozen countries in Asia, and was going to operate in India, Thailand, Indonesia and Papua New Guinea.

He went on to say that the national broadcasting organization in each country would establish a DBU, a development broadcast unit, in each country. The DBU was supposed to produce development broadcasting programming on three major issues — the environment, women in development and human settlements. The whole idea behind the project was to use broadcasting as a tool for social change.

If I was hired as one of the trainers, he said, I would be helping to train the DBU as one of the members of the development broadcast unit assessment team. Later on, he said, I would also have to help the training module unit production team produce a self-contained training module that could be used to establish and operate a DBU anywhere in Asia. And that was how he answered my question.

Now, if you didn't understand what I just said, well, I didn't understand what he was talking about then either. To me it was all bureaucratic gobbledygook. But since I didn't want to blow a chance to go to Asia, and get paid for it to boot, I wouldn't admit that I had no idea what he was talking about.

'At the end of the chain of millions of dollars in Canadian foreign aid . . . was little old me.'

Brian Maracle

is an award-winning Canadian radio producer who has also worked on development broadcasting projects in Asia and has been a training consultant for the Alaska Public Radio Network and several Native communication societies in Canada. He has worked for Native organizations in British Columbia and Ontario.

My silence got me invited to an interview in Toronto where I competed for one of the training jobs. At the interview, they asked me about my training experience and I somehow got off on a tangent about my personal philosophy of radio. I told them that there are two kinds of radio programming. There is Good Radio and there is Bad Radio. Good Radio is the kind of radio that triggers people to action. Good Radio is the kind of programming that makes people stop what they're doing, hush the kids and turn up the volume. It's the kind of programming that makes people say to one another, "Say did you hear about ...?" Good Radio is the kind of programming that makes people so angry, so happy, so concerned or so curious that it causes them to write a letter, to go to a meeting, to send money, to do something. That's what I mean when I talk about Good Radio — it makes people do something. And I'm being only slightly facetious when I say that Bad Radio is everything else.

When I finally ran out of steam, I asked them, "What exactly do you mean by development broadcasting?"

And once again I heard more jargon and generalities, this time from the overall project director, about programming and assessment teams and women's issues and DBU's and human settlements and baseline data and training modules and so on. So I asked the question again. This time they said that if I was hired, I would be sent to the project headquarters in Malaysia where I would learn the details and the how-to of development broadcasting. I was also told that there were four people on each of the training teams, two Canadians and two Asians, and that I would be the junior member on the team.

As it happened, they hired me to be one of the two trainers. I was assigned to go to India and another guy was going to Indonesia. My assignment was to help train ten broadcasters at a DBU in Rajasthan. I spent seven weeks there in 1987 and seven weeks in Papua New Guinea in 1989.

I was pretty happy with the way things were turning out because I knew that I would be learning the ins and outs of development broadcasting when I got to project headquarters. I also knew that I was the low guy on the totem pole. So my first visit to India and to Asia was shaping up to be a well-paid, interesting low-stress job.

The project was financed by Canada to the tune of $5 million and it had a raft of academics, researchers, bureaucrats, organizers, support staff, a board of directors and a board of advisors. And at the end of this very long organizational chain, at the end of the chain of millions of dollars in Canadian foreign aid, the expertise of two international development agencies, the knowledge of dozens of development experts, was little old me.

I was the one who was supposed to transfer Western know-how to ten broadcasters in India, and later, to four broadcasters in Papua New Guinea, to help them combat problems that ranged from leprosy and malaria to urban crime and illiteracy; from the lack of housing and clean water to malnutrition and wife-bashing.

When I arrived at the project headquarters in Kuala Lumpur, I asked the staff, "What exactly do you mean by development broadcasting?"

And they told me more mumbo-jumbo about programming and benchmark data and women's issues and assessment teams and human settlements and training modules and the environment. When I asked them just what I was supposed to train the broadcasters to do, they took me to their library. It was stocked with written and audio-visual materials about development broadcasting. I spent two full days there and I must admit that I learned a lot about women's issues in Africa and human settlements in southeast Asia, but I didn't learn anything about what I was supposed to train the broadcasters to do.

I was getting pretty nervous by this time but I was told not to worry. When I got to New Delhi, they said, I would be met by one of the training team members. He was the liaison worker with All-India Radio. He was the senior Asian on the training team and he would fill me in on what I was supposed to do.

So when I got to New Delhi I asked the liaison worker what All-India Radio was expecting of me. He said they wanted me to train the broadcasters to produce programming about women's issues, human settlements and the environment.

'The trainer discovered the broadcasters thought they were going to be training him.'

That wasn't much help and I didn't say anything about it to him so I asked him about the preparations for the training session. He told me that the ten broadcasters had just completed an orientation session where they had been introduced to the concept of development broadcasting. Right now, he said, they were waiting for me to show them how to put the theory into practice. So I asked him for some of the details of this theory. He was kind of vague and said not to worry, the orientation session had been organized by the other Canadian who was already on site. He said the Canadian was the person in charge of the project there and she would explain everything.

So finally, I made my way to Kota, the site of the DBU training exercise. Kota is a small, grubby, nondescript, industrial city the size of Anchorage in north central India. The head of the project, my fellow Canadian, was there to meet me when my train arrived one morning at 7 a.m. The morning passed in a blur of tours, explanations, introductions and meetings. I learned that the broadcasters were there and everything was in place for the training session to start in three days time.

Luckily, the project director and I hit it off immediately. When she and I finally had a quiet moment together I finally got the chance to ask her, "What exactly do they mean by development broadcasting? Just what is it that I am supposed to help train these broadcasters to do?"

And here's what she told me. "How the hell am I supposed to know? I'm not a broadcaster. I'm just the administrator. Everybody's been waiting for you to show up because you're supposed to be the expert."

So I asked her, "What about the orientation session? These guys were supposed to learn all about the theory of development broadcasting in the orientation session. Who taught that?"

And she said, "It was a waste of time. We spent a month listening to every government official, health authority and academic in town describe their job."

So I said, "Well I thought that I was going to be part of a team. What about the other trainers?"

And she said, "There aren't any trainers. They're liaison people and administrators like me. You're it."

It was my worst nightmare come true. I was instantly sick in the pit of my stomach when I realized the situation I was in.

I was in charge of a training ten broadcasters about something I hadn't figured out for myself and there were going to be lots of people from India, Asia and Canada looking over my shoulder.

(By the way I found out a few months later that I was luckier than the guy who went to Indonesia. At least I was in a situation where the broadcasters were prepared to accept me as a trainer. In Indonesia, the message had somehow been horribly garbled so that when the trainer showed up on the scene he discovered that the broadcasters thought that they were going to be training him about development broadcasting. I heard it was a pretty awkward moment when he had to tell them that no, he was the trainer and they were the trainees. Needless to say, his session got off to a pretty rocky and frosty start.)

In my case, though, I had the right combination of ego and naivete to plunge ahead in spite of the problems.

But I also had my own beliefs about Good Radio and Bad Radio and I also knew that the whole idea behind the project was to use broadcasting as a tool for social change.

Anyway, that's the beginning of the story of my first encounter with development broadcasting. In just a minute I'll tell you exactly what it is and how it works. But I should explain that what I'm about to tell you is not the Bible of development broadcasting. You won't find this information in a book. You won't find a single person in any university or development agency who will explain it the way I'm about to. That's because it's the definition and the program that I came up with. It's not perfect but I think it works in just about any situation. It did do a lot of good over there. And here comes the commercial — I think development broadcasting could do wonders in Alaska.

When I finally got to work with the broadcasters in India and Papua New Guinea, I found that they had been producing programs about development issues for many, many years.

When I sat down with them and got them to play and translate some of their programs for me, I found that they were all basically the same. They were usually about a local problem and in the program a government official, academic expert or some other authority figure explained what they were doing about the problem. In these programs, the authority figures frequently exhorted the listener to take some particular action about the problem.

And when I asked the broadcasters what the aim of their program was, the answer was always the same, no matter which country I was in and no matter what the story was about.

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John Valensi, (foreground) director of the state Division of Information Services, listens to a conference speaker.

What the broadcasters always told me was, "My aim was to inform the listener about the problem." Or, "My aim was to inform the listener about the solution." Or, "My aim was to inform the listener about blah, blah, blah." "My aim was to inform the listener." (Are you listening Alaska? Is it beginning to sound familiar?)

To these broadcasters, and presumably to many others, development broadcasting was simple. It only involved the one-way flow of information from an expert or voice of authority to the listener.

For their part, the broadcasters were always keen to hear what I thought of their writing and interviewing and production techniques. But I wouldn't critique them on how they put their programs together. What I did ask them was if they thought their programs met their objectives. And since their objective was always to inform the listener they said they didn't know if they had achieved it. They thought they might have, but they couldn't be sure. (Are you listening Alaska?)

So I told the broadcasters that there was nothing wrong with their programming. The problem was with their objectives. I said that the object of development broadcasting involves a lot more than just informing the listener.

At this point I referred back to the purpose of the project, to use broadcasting as a tool for social change. And what I did was come up with my own definition of development broadcasting. I define development broadcasting in just two words: "helping people."

And what I mean is helping people — literally. I'm talking about real help, not just information that the broadcaster or some expert or government official thinks the listener needs, but real help. And I'm not just talking about an amorphous body of listeners. I'm talking about real people, people you've met and talked to, people whose name you know, people you've shared a meal with, people whose kids you've played with, people you care about.

A development broadcaster should be a lot more than just a detached dispenser of information. A development broadcaster, in my view, is basically a community development worker who carries a tape recorder.

What I'm talking about, obviously, is a fundamental shift in the nature of the work. A development broadcaster's objective should not be to tell an anonymous body of listeners what some expert or government official thinks they should know. Their objective should be to help people. Okay, here comes the crash course.

If that's the objective, the first thing that has to be done is to identify just who it is that we're supposed to help. The

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obvious answer to me is that we *should be helping* people who need help and who want help. I say it's obvious but it's amazing how many times and in how many places I've seen people, organizations and governments ignore that basic rule. They look at a situation, see a problem and insist on helping the local people to overcome it. And too many times the local people did not want any help because they didn't see the situation as a problem in the first place.

One other obvious rule of mine, that seems to be broken just as often as it's obeyed, is that of the people who need help and want help, we should be in the business of helping the people who need help most. So when I talk about helping people, I'm not talking about helping Donald Trump bail out his financial empire.

'When I talk about helping people, I'm not talking about helping Donald Trump bail out his financial empire.'

Okay. Once we've defined just who it is that we want to help, the next thing we should define is the kinds of help we can provide.

And to my mind, there are three kinds of help that broadcasters can give. The first, and most obvious, is that they can provide information. The second is that they can encourage listeners to do certain things that will make life better for them and their community. And the third thing they can do is that they can help to solve a problem.

So what we did in India and Papua New Guinea was to send the broadcasters, alone or in pairs, into villages, city slums, shantytowns and leper colonies. The broadcasters were not allowed to take their tape recorders with them. Their assignment, over several days, was to meet and talk to as many people as possible.

In India we did this in a very informal and unstructured way. In Papua New Guinea, we sent the broadcasters out to get these impressions in a little more organized fashion. They took out a questionnaire and conducted a survey so that the identification of the problems and priorities was a little more scientific.

What we wanted the broadcasters to do was to find out three things.

We wanted them to learn the kinds of information that people wanted to hear on the radio. We wanted them to learn what the people thought other people should do to make their community a better place to live. And we wanted them to learn about local problems, which problems the community felt were easy to solve and which problems the people were willing to work at.

Out of my three types of development broadcasting, the easiest to produce in terms of time, money and success, is information programming. It also happens to be the type of programming that the broadcasters in India and Papua New Guinea were very familiar with because they had been producing information programs about development issues for years.

But what the broadcasters usually did was this. They invited an expert or government official into their studio, asked them about a particular problem and let them talk. They might ask a couple of unfocused open-ended questions and then they put the "interview" on the air.

Now, that is broadcasting about a development issue but it's not development broadcasting. It may tell the listeners what they need to know and it may be about something important but it doesn't tell them what they want to know.

The only way to give the listeners the information they want is to let them ask the question. So that's what we did.

In Papua New Guinea, the broadcasters came back from their research visits to various communities and sat down to analyze the results. We found that many people in many areas wanted information about a wide range of subjects. In one shantytown we found that a large number of women wanted to hear about nutrition and meal-planning.

So we got the broadcaster to go back to the shantytown and get the women together. She asked them if they wanted to learn about nutrition and meal-planning. They said yes. She told them that she would bring a government health worker to the shantytown and she asked them if they would meet with him and ask him the questions they had. They said yes. Then she asked them if they would be willing to let her tape-record the meeting with the health worker so she could put a radio program together. And again they said yes.

So we asked them what questions they wanted to know the answers to. They didn't give us many to work with and they were pretty vague but they assured us that they were interested in meeting the health worker. Despite their assurance I was still a little afraid that the meeting would be a bust.

So next we went to the health official, who had been talking on the radio about nutrition just a month before, and got him to agree to visit the shantytown with us and meet the people there. While we were talking with him we got him to write out a list of questions that villagers ask him most often.

So we went back to the station, and we wrote up a list of questions using the ones from the women, the health worker and some the broadcasters came up with. We had about a dozen questions that we thought would make a good interview. Questions like "What goes into a balanced diet?" and "Why should I eat a balanced diet?"

We took the list of questions to the shantytown and showed them to the women and asked if they would like to know the answers. The women were shy and nervous but they said they would meet the health worker and ask the questions on the list.

When the day of the meeting came around, the women of the shantytown and a few men were gathered under a large tree in a communal courtyard. The broadcaster turned on a tape recorder and introduced herself and the health worker. She said that she was doing a program about nutrition and that she was in such-and-such a shantytown because the women there wanted to learn something about it. She then pointed the microphone at the woman who was supposed to ask the first question on the list. The woman was very shy and except for a nervous giggle, she didn't say anything. The problem wasn't nervousness. The problem was that she couldn't read. But after a little prompting by some of the others, she asked the question about what goes into a balanced diet and the health worker answered it with what seemed to be his usual spiel.

'Within minutes, those neatly written pages of questions that had been so carefully thought out were littering the ground.'

This stiff and artificial exchange of nervous questions and standard replies continued for about three go-rounds until one woman in the crowd interrupted and asked: "My baby only likes to eat rice. Is that good?"

Instantly the women in the crowd murmured and leaned forward. The health worker stopped for a second and became very animated in his reply. The women laughed.

Then another woman butted in. She was six months pregnant and she explained that she had to work in the fields while her husband laid around the house all day and didn't work. There was laughter and murmuring from the crowd. The woman went on to say that when mealtime came, her husband would point out that in addition to being the man of the house, he was still bigger than she was, so he was therefore entitled to have more food then her. So this woman asked the health worker if this was right.

There was a lot of murmuring from the crowd now and the health worker launched into an answer that had everyone laughing and nodding their heads.

Then a man raised his hand with a question about bush food which the health worker eagerly answered. And within minutes, those neatly written pages of questions that had been so carefully thought out were littering the ground as the people fired question after question to the health worker about the things that they wanted to know.

The session lasted more than an hour. The broadcaster ended up cutting the session into three separate segments about three different aspects of nutrition.

Now, what was so special about those three programs was not the information, energy or spirit they contained, although they were pretty special, what was special was that the program's objective was achieved before it ever went on the air.

The aim of that particular program was to give the women in the shantytown the information they wanted about nutrition and that was achieved before the broadcaster even shut off the tape recorder.

Once the program was broadcast it took on a secondary objective, namely, to inform other listeners about nutrition. At this point I can't be certain just how effective the program was in meeting that particular objective. But I like to think that that program was a hell of a lot more effective in communicating a nutritional message than a run-of-the-mill, straight-ahead interview or documentary. I like to think that it had a tremendous impact on listeners in other shantytowns, not because of the writing or interviewing or production techniques, but because poor, uneducated people were the driving force behind the program; because poor people in other shantytowns got to hear the answers to their concerns and not just what experts and government officials thought they should know.

So. That's an example of development broadcasting when it comes to information programming.

The second type of development broadcasting, in my definition, is programming that encourages people to do something that will make life better for them or their community.

It happens to be the only type of development broadcasting that is routinely done in North America. In fact, it almost seems to come naturally here. You give someone a microphone and some air time and the next thing you know they're telling you what to do and how to run your life. Don't drink and drive. Practice safe sex. Get some exercise.

And since most of those public service announcements sound like the voice of God telling you what to do, I'm not sure they're as effective as they could be.

Anyway, here's how we handled it in Papua New Guinea. As part of our survey in the communities, we asked people, "This would be a better place to live if the people here did what?"

What the people told us was that their community would be a better place to live if the people respected the elders more, or if the people went to church more or if they drank less.

So we produced a number of programs in which the objective was to encourage people to do those kind of things.

Anyway, there is a talented drama group in Papua New Guinea called Dua-Dua that writes and stages plays, musicals and dramas about social issues. One of the issues they deal with on stage is drinking. So we went to Dua-Dua and brought them and their instruments into the studio and produced a half-hour musical drama that warned about the dangers of alcohol and praised the virtues of moderation and sobriety.

In India one of the broadcasters produced a 30-minute musical about the importance of children going to school. He happened to be an extremely talented musician and songwriter and he wrote the musical in response to the wishes expressed by some people in a village that they wanted to see more parents keeping their kids in school instead of taking them to the fields with them. So he wrote the musical and got a group of children to play all the parts. He staged the drama in the village courtyard and tape recorded it.

Both musicals were broadcast and I think they would have been very effective in meeting their objective because they were providing the encouragement that people in the community wanted.

Entertainment, as a form of development broadcasting, is very effective but it's not easy to produce and it's very time-consuming and it can be expensive. So the formats we ended up using most often were easier to produce, didn't require a lot of talent and were a lot shorter. What we did produce were songs, jingles, slogans and what I call mini-dramas, short skits about two minutes long.

I think this type of programming, where the objective is to encourage people to do something for the good of themselves or their community, is automatically successful when it is based on what people in the community want. When the program goes on the air it has met its objective.

The quibble I have with North American programming of this kind is that not enough of it is based on what people in the community want. Too much of it seems to come from the government, medical authorities or the police, and it amounts to little more than nagging.

The one good example of North American programming in this area that I can remember comes from the Mormon Church. They produced a series of ads a few years back and the one I remember best is the one where a young boy comes banging into his house all smiles and excitement and he yells out, "Hey, Mom. I got an A on my report card." And the mother yells back, "How many times have I told you not to slam the screen door when you come in." Of course the point of the spot was to listen to your children, to share their joy and celebrate their achievements. To me, it was a good example of development broadcasting. The pity of it is that there are very few examples of that kind of programming around.

The third and last type of development broadcasting, and the hardest to produce, is the kind in which the objective of the program is to solve a problem.

When we did our research in the communities, we found lots and lots of problems. So what we did first was narrow the list down to small problems that could be solved.

Here is a list of some of the problems that the broadcasters set out to solve: a city neighborhood that didn't have a water tap; a group of neighborhood women that didn't know how to read and wanted to learn; another group of neighborhood women who didn't know how to sew and wanted to learn; a leper colony that was not getting medical care; and a broken water pump in a village well.

In each case, the broadcaster's objective was to help the people solve their problem. Here's how they did it:

The first thing they had to do was to gain the trust of the people in the community. Then they had to identify the problems that the people in the community felt they could solve and the problems they were willing to solve.

'In each case, the broadcasters' objective was to help the people solve their problem.'

Then the broadcaster had to find possible solutions and find people willing to help solve the problem. The next step was to put the people who were suffering the problem together with the people who could help them solve it.

Let me stress that the job of development broadcasting is not to fix the broken water pump or to teach the women to read. A development broadcaster is simply a catalyst who brings together the problem-sufferer and the problem-solver.

And once the problem is on the way to being solved, the broadcaster's job then is to make a radio program about the process of the two sides getting together and solving the problem. All of the problems I mentioned a minute ago were solved. The broadcasters helped the women who wanted to learn how to read by finding a local woman who agreed to teach them for a small fee. They helped the women who wanted to learn how to sew by finding a government program that would teach them.

The broadcasters helped the people in the neighborhood without a water tap, too. They found out that if the people in the neighborhood filled out the proper application and paid the appropriate fee to the city, they would get a water tap. And the people did just that.

They helped the people in the leper colony by bringing them and the appropriate hospital unit together. The doctors went to the colony and showed some films on the importance of treatment. They treated many of the people there and explained how they could continue receiving treatment.

And the broadcasters helped the people in the village with the broken water pump. They found a man who knew how to fix the pump and they found out the cost of the new part that was needed to fix it. The people in the village took up a collection and the man bought the part and fixed the pump.

The objective of all of these programs was to help the people solve their problem. And in each case, the program's objective was achieved before it went on the air. When these programs were broadcast they took on secondary objectives — for example, to inform other listeners how to fix a broken water pump. And because the programs were success stories in which poor and uneducated people overcame a problem. I think it may have encouraged other people in the same situation to do the same thing because of the example it set.

So far I've been talking about individual programs with relatively narrow objectives. In Papua New Guinea we found that one of the major problems that people wanted to deal with was malaria.

We planned to tackle malaria with a series of programs that would be produced and broadcast over a two-month period.

'I like to think that, because of the way the programs were produced . . . the incidence of malaria was reduced in other areas.'

As part of the campaign, we planned a number of information programs that would give people the information they wanted. One program was on the nature of the disease itself. One was on the treatment of malaria. And there were two or three programs on ways to prevent it.

We could have produced all these programs, with the villagers asking questions of the respective medical or government authority in just one place, but we spread them around instead. So the plan called for the people in one village to learn about the disease itself. In a shantytown a group of women learned how to treat it. And in a couple of other places, the people learned different ways to prevent it.

We also produced a number of songs, jingles and mini-dramas that encouraged people to get treatment for malaria and to do something about preventing it.

Lastly, the plan called for the broadcasters to help people in several places who wanted to do something about malaria. So we helped them remove breeding zones for mosquitoes by getting the people to conduct village clean-up campaigns. We helped them get mosquito nets and we helped them to start raising a type of fish that eats mosquito larvae.

In the end, the broadcasters put on an extensive and coordinated campaign, but I'm under no illusion that it resulted in the eradication of malaria in Papua New Guinea. However, I am certain that it did reduce the incidence of malaria in at least those areas where the broadcasters worked and I like to think that because of the way the programs were produced, with the local people in the driver's seat, that the incidence of malaria was reduced in other areas as well.

As you've seen by now, development broadcasting, at least what I call development broadcasting, is considerably different from mainstream information programming.

The most important difference, to my mind, is that unlike mainstream information programming, development broadcasting achieves its objectives. This has the advantage of making the job much more satisfying to the broadcasters because they know they're meeting their objectives. They're not troubled by the possibility that they are wasting their time because their work is just disappearing into the ether.

But more important than that, at least from the broadcasters' standpoint, is the extraordinary satisfaction they get from helping real people solve real problems.

One of the other advantages to this type of broadcasting is that it bridges the tremendous gulf between broadcasters and listeners. It brings them together and makes the broadcasters understand, usually for the first time, just who they are talking to. (Are you listening Alaska?)

In India, a broadcaster at All-India Radio is a Very Important Person. They are usually extremely well-educated and come from one of the high castes.

When I first asked them to spend days in villages, slums and leper colonies by themselves, without their car and driver, they rebelled and refused to go. But eventually they did go and after they had come face-to-face with some of the poorest people on earth, after they had talked to them and learned about their problems and shared a meal with them, they began to care about these people as human beings not as listeners.

In fact, they came to have an emotional attachment with these people. They came to care about their problems and became committed to solving them. In fact, it wasn't too long before I couldn't get the broadcasters into the station because I couldn't get them out of the slums and the leper colonies.

I can look back on my seven weeks in India and my seven weeks in Papua New Guinea and say with a great deal of pride and satisfaction that I helped those 14 broadcasters do a hell of a lot of good with very little time and very little money.

When I think back on my time there, I think of a dozen women who started to learn how to read. I think of a dozen women who started to learn how to sew to increase their family's income. I think of the dozens of women and children in one city neighborhood who will be able to get water at the corner instead of a half-mile away. I think of the two dozen lepers who are getting proper medical care. I think of a hundred villagers who won't have to walk to the river because they learned how to fix a broken water pump. I think of the dozen women who learned how and why they should prepare a balanced diet for their families. And I think of the dozens of people who learned how to prevent malaria and did something about it.

I think of these people — hundreds of them — people I have seen with my own eyes, people I have talked to, shared a meal with and come to care about. I think about these people and I feel enormously grateful that I had a chance to help make their life a little better.

I couple that feeling with the hope and the certainty that the programming that was produced in those countries will lead other people to live just a little bit better as well.

Which brings me to Alaska. Now I have to admit that the only firsthand knowledge I have about this marvelous state consists of the Captain Cook Hotel, the offices of APRN, downtown Anchorage and not much more.

But I have spent a lot of time working and travelling in the Yukon, the Northwest Territories and northern British Columbia. So I think that while I may not know the specific details of life in Alaska, I do think I know a lot of the generalities.

And what I know is there is a need for development broadcasting here. There are people in this city and in all the other cities and in all of the villages in this state who need and want help to make their lives a little bit better.

'I believe that the media can and should become a partner in the process of development.'

There's no reason a development broadcasting type program can't be established here. The only thing needed is an act of will. It may require a will on the part of the state to become a partner with the communications media to aid the process of development. It may require a will on the part of the private sector to take a more active role in helping the poor. And it will certainly require a will on the part of the radio, television and print media to see themselves as something more than just the disinterested dispenser of information and entertainment.

I believe that the media can and should become a partner in the process of development. I believe that they can and should be a tool for social change.

And, let me stress, not just radio. As much as I love radio, I recognize its limitations. It is a poor tool when used all by itself to deliver information. It's more effective when it's used with other tools — television, video and printed material.

When I talked about the accomplishments in India and Papua New Guinea, I didn't mention how little in the way of equipment we used to achieve them. The most sophisticated piece of equipment we used was a tape recorder. The studio equipment we used ran on vacuum tubes. There were no photocopying machines, no telephones, no typewriters, no satellites, no wire service, no computers and no fax machines.

So the thought that I was going to be speaking at a conference sponsored by the Center for Information Technology caused mixed emotions in me. One part of me was eager for the chance to find out about the latest in information hardware. That's because I'm a nut about gadgets and technology and I'm fascinated by the creative genius of the human mind. But at the same time I can't help thinking about the problems of an increasing number of poor people in one of the richest countries in the world. And I get sad and I get angry when I think about our brilliant technological achievements and the often silly uses we make of the mind's creations.

In North America, broadcasters are blessed with the latest technology. We have hardware and software out the ying-yang. But the missing link in our technological chain is the fleshware. We are pitifully short on the human element in broadcasting and it's getting shorter every day. The object of much of broadcasting today seems to be to produce more and more programming with less and less human involvement. In fact, today it's possible to operate a completely automated radio station with no human beings at all.

Well, I think it's about time we put the fleshware back into broadcasting. And there is no better place to put it than into development broadcasting.

I'm the first to admit that development broadcasting is not without its drawbacks. It would be expensive to implement in this country and it would require a lot of organization and co-operation for it to be really effective.

And I realize that development broadcasting is not about fundamental change. Some people might even call it a band-aid approach because what I've been talking about are small problems. I would point out, though, they're not small problems to the people in the slums and in the villages. Helping them to solve a small problem is a small victory. But the process of involving people in overcoming a problem empowers them, to use the latest buzzword, and I think that process of empowerment will lead to even greater victories later on.

I thank you for your patience and your interest.

Center for Information Technology Reports:

'What we don't have is a record of evaluating what we've done'

Larry Pearson, **director of UAA's Center for Information Technology, worked for newspapers in Rome, Italy, and Minneapolis, Minn., before returning to the University of Minnesota in the early 1980s to get a Ph.D. that combined study in mass communications and in management information systems.**

You might describe this as the best of times, the worst of times. It's difficult to know exactly how to begin this session in which we describe the activities of the Center for Information Technology.

This is the third Chugach conference, the second one that the center has sponsored. Last year those of you who were here at the second conference may recall that I said the sponsorship was admittedly nominal because the center was so new that it really hadn't been able to put the staff work into the preparation of the conference that we would have liked to. In fact, I think we got our first budget during the week before the conference started. So it was a very new event.

Now we've had the center in place and in operation for nine months and we've had excellent staff work. Harriet Shaftel, who was seen at the registration desk for the last day and a half, has spent months doing logistical work making sure that the arrangements would be just what we wanted them to be, doing a lot of background work that takes a lot of time. You've received this summer, many of you, the proceedings of the second conference. So that is another conference activity that was made possible by the center.

Now today we're under a cloud; there's uncertainty about our future.

In this session we're going to talk about the things we are doing now, the things that we think are really important to be done. There may be questions about how those things are now going to be done. But we really can't address those. I'm going to speak first. You'll hear from two other people who are associated with the center. You'll hear about their activities.

I'd like to talk first about a couple of things that I think it's important for the University of Alaska to address. First of these is the issue of distance education. UAA's chancellor, Donald Behrend, spoke about that issue at last year's conference. We've heard some talk at this year's conference. And there's a small discussion group that is looking at the issue of distance education. It's an important activity in Alaska given the nature of our state and the nature of the population distribution in our state. We have very elaborate telecommunications systems that are in place to support distance education activities.

What we don't have is a record of systematically evaluating what we're doing, how we are using those technologies in distance education. We are in the position of using things that work but may not be the best solutions to pedagogical problems, to teaching problems. What should we be doing to make students who are separated from their instructors, who are physically separated from each other, who are connected to the classroom by a telephone line, what can we do to insure that the classroom, whether it be in the secondary level or whether it be a college class, what can we do to insure that the quality of that experience is as comparable as possible to what they get in the classroom?

Who's evaluating alternatives? Who's looking at the options?

Is broadcast television the best solution? Is audioconferencing the best solution? Is electronic mail the best solution? What combination of those various technologies might work best in a given situation? What is the teacher trying to accomplish? What do we want the students to go away with? Who's checking? What do we know about the effectiveness of those things? What do we know, four years after Learn Alaska was shut down? What did Learn Alaska accomplish? Where is the record? Who has the evidence? I just have not seen it. So I think there's a real need to address that issue. To see if we can not simply provide distance education to people who need it, but to see if we can do it better. And that's a research problem. We need to attack that problem not from the technology perspective, but from a teaching perspective.

One of the things that I spent some of my time during the last six months doing is talking to faculty in the schools of education on all three campuses of the University of Alaska system. People like Jason Ohler, who you've heard at this conference; and people at the schools of education at the University of Alaska; people like Barry Willis, who is in the audience; and people like Barry Sponder, who is at the Kuskokwim campus and who was a speaker at this conference last year talking about this very issue. And seeing if we can put together a research program that tries to address this as a single research problem that requires concentrated efforts, a concentration of energy, collaborative work.

'We can create coalitions in providing training . . . and you should be speaking up on this issue.'

We have 15 people in a group right now that is in the first stages of drafting a project proposal. And our initial goal is to refine our thinking about what we should be looking for, what we should be trying to identify as the issues of concern, so that we can write a draft proposal by the end of the year. I think that's important and I think that's missing and I think that's something that needs to be done that can be done.

The second issue that is of concern to me is the issue of training. And training is one of the concerns that was behind the legislation that created the center itself. Training is mentioned as something that the center should be involved in and making a contribution to. I think there's a real need for training in telecommunications. The center itself is not an academic department. I'm the only person in the center who has faculty status. We're not associated with any academic department. We are part of the College of Arts and Sciences at UAA but we do have systemwide responsibilities. That's one of the things that's made it possible for me to deal directly with the deans of the schools of education at the various campuses on that other issue.

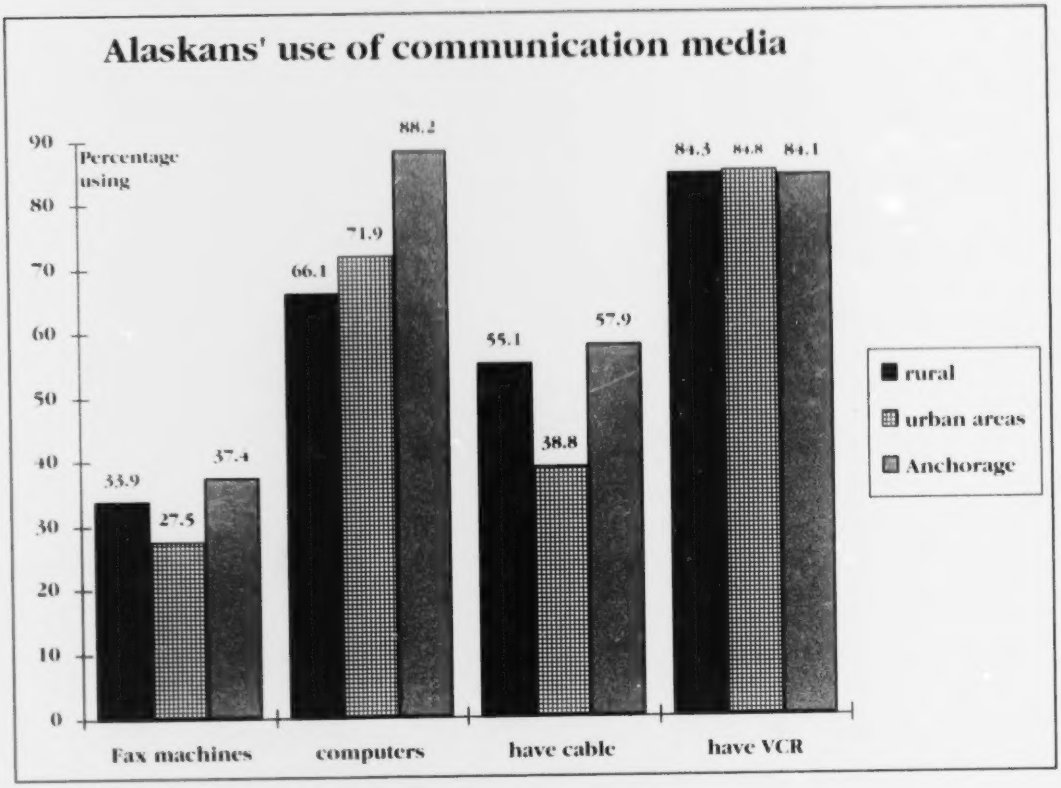
But we can create coalitions in providing training just as easily as we could try to create coalitions on that issue of evaluating distance education. So that's something in the last few months I've spent some time thinking on and talking to other people about. You people are the people to tell me whether I'm correct, and you should be speaking up on this issue in various ways.

I think there's a need for mid-career training in information industry professions in Alaska. I think that's something that could be done fairly easily at very little risk for the university system. I don't think we are talking about something that's going to cost the university system a lot of money to do if it's initially done in a modest way. So I've been talking about starting with a summer program in the summer of 1993 that would probably be a four- to six-week program. It would be for people already working in telecommunications in the state, people who are working for the telephone companies, for the oil companies in the telecommunications positions, working in various other sorts of businesses.

There would be three strands to this program. There would be a technical strand that would consist of instruction intended to help people upgrade their technical skills, addressed at working professionals. The second strand is the policy regulatory strand. That strand is intended to improve the knowledge in the areas of effective business environment, the context in which people work, policy regulatory issues. And the third area, again thinking that this program is aimed at people who are in the late 20's, early to mid-30's, roughly that age. People who've maybe been in industry 5, 10 years, 15 years. Those are people who either are moving into management ranks or who want to. Perhaps they didn't go to business school or perhaps they really haven't had any interest. I saw this in the newspaper industry when I was working in that; you move up into those years when it's natural for you to move into management and you really don't know how to manage, but there you are. I think that's an important strand in a program like this. It's aimed at the career professional.

So those are three kinds of things that I think a training program could be addressing. And that's a program that draws on academic skills from very different areas; electrical engineering at one end, government policy, political science, whatever, business schools. Lots of possible places where faculty could be drawn from, information science programs and so forth. What you look for are the people who have the knowledge that you need to convey to the students. Some of them are there in the University of Alaska system, some of them are not.

This last weekend I was in the Washington, D.C., area at a conference that in some ways has had some of the goals at the federal level that the Chugach Conference has at the state level. And I talked to the director of the telecommunications program, the graduate program, at George Washington University in Washington, D.C. He's very interested in the prospect of coming to Alaska for six weeks in the summer to teach classes in telecommunication policy. He knows the subject. He's a very respectable faculty member for a program such as this. We're really in a position where we can, by mixing the faculty who are available, and the rest of the faculty who are available from other campuses, make this a very strong program very



quickly. It will be very, very good, could meet real local needs, could also attract people from other universities. That's something that I think is a real practical possibility.

It requires, before anything else, it requires a real expression of interest from the people it might serve. So, I leave it with you as a possibility and it's something that maybe one of the small groups might want to talk about to see if you really think that is a practical idea, something worth pursuing.

I have left myself just ten minutes to talk about one of our first research projects, which was a statewide survey conducted early in this year, February and March. It was an attempt to accomplish two things: to get a better idea of how people in Alaska use communications, use VCRs, phones, television, things like that. And also to see just how much they got out of that. I was most interested initially in getting an idea of how well served the people in rural Alaska are compared with people in Anchorage.

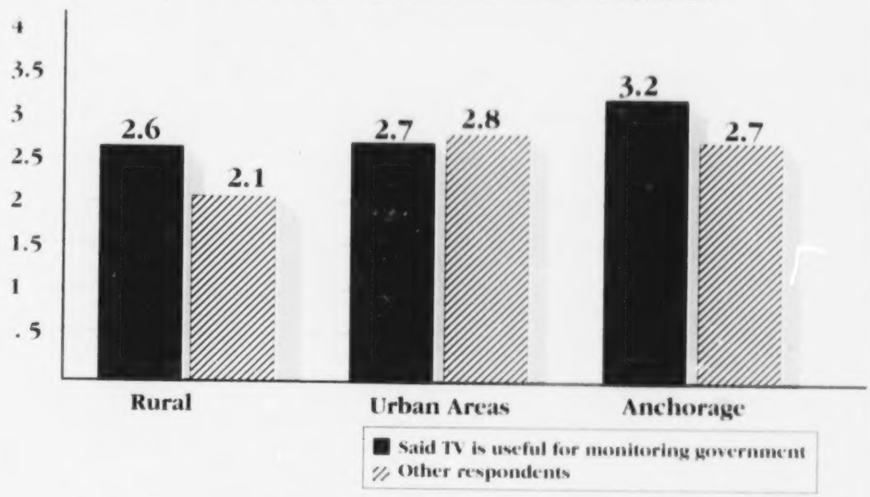
We have very different media environments. Anchorage has got everything. We've got two daily newspapers, we have more television stations than we can count. A group of people at supper last night had trouble deciding how many broadcast TV stations we've got. We've got a lot. We've got 20 radio stations or more. Lots and lots of media available. Rural Alaska, as those of you from the state certainly know, is a telecommunications environment; it's not a print environment. The newspapers that are available in much of rural Alaska are not local, they're not daily. They are regional weeklies. There are not very many of them. So really even though telecommunications in rural Alaska is fairly new, it's not replacing an older print culture. There never was an older print culture, not one that was generally accepted. So it's a very different sort of environment, very strange.

And we wonder about information, or at least I wonder about information. How well informed are people in rural Alaska? Are they really in a position to participate in the political life of the state, for example? Well, I have some questions that will give you some ideas about that. Very quickly now I'll give you some ideas of what I've found. What I'm going to give you is some basic overview information.

We're looking at some of the things that we found in the survey. The first series of figures here, one of the questions was, "Have you used a FAX machine in the previous two weeks?" So one use of the FAX machine in the previous two weeks gets you into one of those bars. Black bar is rural Alaskans, the middle checkered bar is in smaller cities ranging in size, one extreme from Fairbanks down to places like Sitka, St. Petersburg, Wrangell, and so forth, Mat-Su Borough.

Context, should you believe this information? It's based on a telephone sample of 500 Alaskans. The actual surveying was done for the center by the Institute for Social and Economic Research. I did the design and the analysis, they did the surveying and the sample selection. Generally we use pretty much the same sorts of procedures that are used in the Gallup Poll. So these are estimates. I mean any information you get in any survey is an estimate, these are approximations. But they are reasonably close, within plus or minus 3% or so of what we'd expect you to find if you went out and took a census of the people in this state. We think the answers are within that range. Add or subtract three or four points, four at the most, from any of these

Number of Persian Gulf Figures Named by Use of TV for Surveillance of Environment



	TV useful	Other	t Value	Sig.
Rural	2.6 (N=80)	2.1 (N=45)	1.52	.07
Small Urban	2.7 (N=98)	2.8 (N=76)	-.33	NS
Anchorage	3.2 (N=102)	2.7 (N=92)	1.75	.04

T test values are one tailed probabilities.

figures and the actual figure should be in that range.

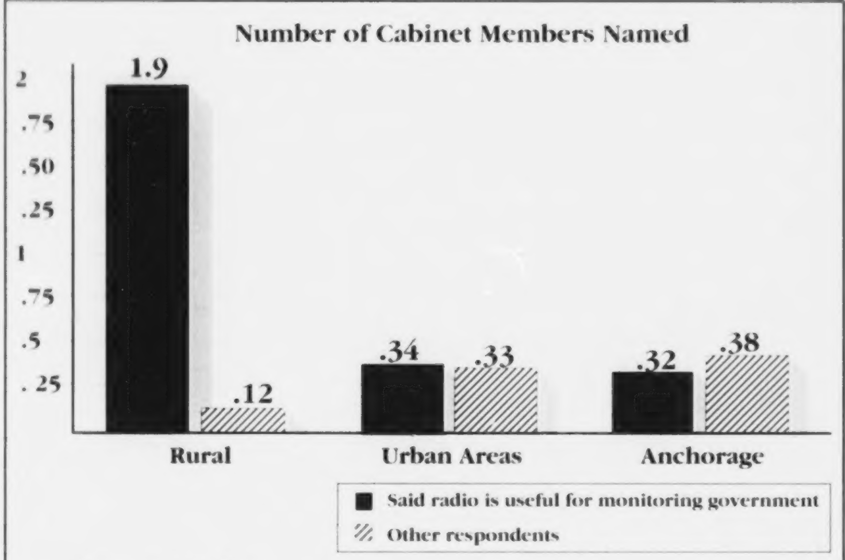
So fax machines, they are becoming accepted according to this evidence. Computers, what was asked here, this was a very general question. "Have you ever used a computer?" Okay, so 10 years ago you sat down and used one for a morning and now you remember that you did. So you say yes. This question is not measuring intensity of use but just whether you've ever sat down and used one. You'd expect the figure, when the question is that general, to be fairly high and it is. At least 66% of the people even in rural Alaska at some time or another used a computer. About a quarter of the people who'd used computers had used them for communications, for computer conferencing, the sort of thing that Davis Foulger was talking about the other day. About a quarter of the people who actually have used computers have used them in that particular way.

Have cable. This figure is a figure for people who have cable in their homes. This is for people who are in villages where cable is available, or communities, cities where cable is available. The percentage of the households, respondents in those villages, those places who said they had cable. More than 50% of the people in rural Alaska or in Anchorage, in places that had cable, said they used it. The figure is markedly lower in the smaller cities. That was an interesting difference. I found what I thought was an interesting explanation for it.

VCRs — they're universal, 84% across the board. Regardless of where they live, 84% of the people have VCRs. You're getting up there into the same range as you have telephones. So we've got something like universal VCR rates. Looking back at the state congressional election, it made a lot of sense for Don Young to send out VCR tapes during that election. He really had a good handle on his audience. If I was a political candidate in Alaska, that's a pretty interesting way of advertising. It's a fairly inexpensive way to construct a message. You've got complete control once the person turns the cassette on, and almost everybody can. One local businessman, after seeing this information, used it to start up a new enterprise within his cable related business. He decided that there really was a marketplace for it.

The other issue I looked at was how well informed people were in rural Alaska compared with Anchorage. How much of a disadvantage was it to be in a place that had a really limited media system; to be in an environment that might be described as media poor? The survey was conducted during the Persian Gulf War. The survey had, in effect, a news quiz. People were given occupational descriptions of public figures involved in various areas in the Persian Gulf crisis. Who's the Secretary General of the U.N.? Who's the U.S. Secretary of Defense? Who's the Persian Gulf commander? Who's that guy over in Iraq, that despot over there? And then we added up their answers and the more you answered correctly the better informed you were assumed to be. This was a TV war, presumably, so it's ideal for looking at information in rural Alaska. It's a TV war, they've got TV, they've got RATNET. So, they're watching the war on RATNET. Some of them are watching it on cable, although not all cable systems had CNN. So you'd expect them to be pretty well informed.

It's not what we see, when we look at people who said that they found television a useful way of surveying the environment. The question was asked in that way to separate out the people who were trying to get information from television from the people who were simply turning it



Interesting, but . . .

Differences between means -- even for rural areas -- were not statistically significant.

on to watch entertainment programming. People who were trying to get news on television, trying to get information on television on the war, we'd expect them to be better informed than people who weren't simply because it was a television war.

That's the case in rural Alaska. The people who were using television in that way were better informed than the people who were not. The difference is large enough to be significant. But you go across the other way, and there's really not any real difference between those best informed rural Alaskans and either of the groups in the small cities, or in Anchorage. In fact, they come off much less well when you compare them with the television users in Anchorage. And I think the difference there is that incidental exposure that's available in Anchorage. Regardless of how important television might be to you as a source of information, in Anchorage there are other sources. It's pretty hard to avoid getting that information other supplementary sorts of ways. It happened. It didn't happen in rural Alaska. That's my interpretation of that particular finding.

AUDIENCE MEMBER: What are those numbers?

PEARSON: That's simply my evidence that the differences are statistically significant. My magic. Where it says 'sig' it's short for significance. So for Anchorage the difference between 3.2 and 2.7 is a big enough difference so it's statistically significant at the .04 level. The difference for rural Alaska is big enough to be statistically significant too, but at a higher level. It's not quite as clear a difference. In fact, a very strict significance test would say that's not a big enough difference to be statistically significant. Some say .05 is the cut off.

AUDIENCE MEMBER: What I'm asking is what do the numbers represent, 3.2, 2.7, is that the number of people?

PEARSON: Sorry. The average number of questions they could answer correctly. So, 2.6 is the average, 2.6 correct answers out of a possible seven.

DIANE KAPLAN: Isn't there a language effect in there? People who are not as fluent in English? Aren't they maybe less likely to rattle off names than somebody who is?

PEARSON: I can control for that. I haven't tried a control for that yet. I couldn't give you an offhand answer. When I asked a similar question in an earlier survey it did not show to be a significant difference. I did separate out ethnicity as a control factor in another survey done before, and it was not a factor. It could be here, and I just don't know at this point; it's a possibility.

I have one last table and then we'll go to Rosemarie. I asked people to name as many members of Hickel's cabinet as they could. This was at the time when probably the biggest single statewide news issue was those appointments of cabinet members. It was really something you'd expect folks to know. Here you have to remember they had, at the time we asked the survey, they had 15 people. You see the averages are something less than one. This didn't work. This is interesting but not statistically significant. So few people could name cabinet members that, although I have a really large difference there, it's not statistically significant. It is suggestive, but I can't go to court with that. It was the sort of difference I was hoping to see because it bolsters a belief that I have based on previous research I've done that radio is really the medium in rural Alaska that is substituting for newspapers as the most local information source. And you see it; this is the radio table. The people who said radio is useful for monitoring government. No difference in urban areas. No difference really in Anchorage; what difference we see is in the reverse direction. Again, remember, it's not statistically significant. An enormous difference in rural Alaska. But again we're talking about very few people who are able to mention, or name any cabinet members at all. So ...

DEAN GOTTEHRER: Larry, did you make any distinctions among the kinds of radio that these people listen to, public radio versus commercial radio?

PEARSON: No, I didn't ask.

GOTTEHRER: I'm wondering if that large difference, even though it was not statistically significant, might be attributed to the fact that public radio is far more prevalent in rural areas than it is in urban areas.

PEARSON: And when you think that I also....

GOTTEHRER: And when I think of APRN's coverage of government, that might contribute.

PEARSON: I would expect what we saw to be almost all public radio because remember that middle group was the small cities. In rural Alaska, you don't find commercial radio in many places outside those small cities. And so they are separated off in a different category. So I think that was almost all public radio.

GOTTEHRER: In the rural areas.

LLOYD MORRIS: So, Larry, what does that tell you about the administration that wants to cut the budget for public broadcasting?

GOTTEHRER: They don't want us to know the names of the cabinet members.

PEARSON: There are two sorts of answers that I could give and might give depending upon the audience. Public radio... there are two things: the state has a responsibility and public radio has a responsibility. The state has the responsibility is part of the answer you wanted to hear. I don't know if you wanted to hear the public radio part of that answer or not. I hope you did. They're both real important. Rural Alaska does not have the economic base to support commercial radio. It just doesn't, we can see that. Certainly it does not have the economic base to support commercial television. There are no commercial television stations in rural Alaska. Cable television is another issue. It's an interesting one and we're still watching that. There are cable television people in the audience, and perhaps in the small groups, they are talking about what their experiences have been in moving those systems into rural Alaska. Commercial TV is not going to go in, commercial radio is not going to go in in the near future.

So when I'm talking simply about information, if we think it's important for people in rural Alaska to be able to participate in the political life in this state, for them to be a part of this state as a community, we're talking now about something else, too, the social life of the state, of the culture, then I think there is a real continuing obligation for the state to be involved. I don't see how the state can not be involved. I feel very deeply about that. There's also a responsibility that goes along with that for the people who are accepting that mandate to recognize that along with that support from the state there's an obligation to do those things that connect people, that make them a part of the state, that make them feel that they are a part of the state, so they can participate in the political life of the state, so they feel a part of the cultural life of the state. And that's another issue but they're tied together, they are intertwined.

The next speaker is Rosemarie Alexander, the center's visiting research associate who comes to us from Michigan State University where she's in the Ph.D. program. She is doing something that's needed doing for a long, long time. She spent the last month in northwest Alaska looking at communication in a single village. She looked at a village that is about to get cable. I think it's getting cable this week. And she spent the month there, talking to the people. She interviewed people in every household except I think there was one that the folks were reluctant to talk to her. She did interviews with children in school. She's going to tell you about what she found. Again, she's right in the middle of the project still so you are not going to get the detail yet. But, what she is doing I think is critically important. She's had a great deal of support in doing this from people in various places in the state who share that view. The airlines have donated tickets for her and an associate researcher. Willie Hensley has donated money for travel expenses, too. The legislator for the NANA region, Eileen MacLean, has done an awful lot to ease the way for these researchers into these villages. All of these things and more that she may talk about represent a real commitment by a lot of people to help us get information we really badly, desperately need to understand what's going on in rural Alaska when television comes in. And when television changes. Again, no one has done anything like this in 10 years. It's a major undertaking, it's an expensive sort of undertaking to do — one reason why it hasn't been done. It's vitally important gathering information that hasn't been around, that really hasn't been used in any decision making. She's going to tell us more about that.

ROSEMARIE ALEXANDER: As Larry said, I'm working on a doctorate from Michigan State. But I'm also from Juneau and I've lived in Alaska since 1980. I consider myself an Alaskan.

Some of the things that we have been looking at I have lumped into the generic title, "The Role of Television in Rural Alaska." And I did that for a very specific reason because we're looking at a lot of different variables out there. The center has particular things that it needs some answers to. Larry and I both feel that the legislature is interested in some very definite policy questions which we can try and get at in our little pilot study. And I also have a lot of cultural variables that I'm interested in for my dissertation. Things that will eventually, we hope, work into some sort of knowledge that will help us make programming to rural Alaska a lot more relevant. Perhaps even some of the type of development things that Brian was talking about earlier.

We started really small with just three villages. That makes it basically a pilot study but we do believe that when we're finished here we're going to have the kind of data that people can take and do broader studies and help us find out more things.

For those of you who are from out of state, RATNET, the Rural Alaska Television Network, started in 1977 as the Television Demonstration Project. It went up in 23 villages as a satellite demonstration for one year. With little ado the legislature expanded it and we now have 248 RATNET villages. Many of the villages out there get only RATNET. That's all they see.

About 90 of those 248 villages now have some sort of cable system. And we're finding that cable is going in quite rapidly in the villages. Programming for the RATNET, again for those of you who don't know about this, is selected by a 17-member board called the RATNET Council. Twelve members represent the 12 Native regional corporations in Alaska. Two members are appointed by the governor, which are at-large members, and three represent education and public broadcasting. They select programming for RATNET from the Anchorage affiliates, including the FOX Network. They also get stuff from public television and from Alaska producers. Unfortunately, in the world of public television cuts, we see fewer and fewer programs available on Alaska even though we have a channel that is really supposed to be just feeding Alaska. For most of the bush communities, as I said, RATNET is their only source of TV news. And Larry explained that kind of vast wasteland out there of news that's available.

'Our study has three phases, a pre- and post-cable survey in one village . . . then we compare Village A with two other villages that have RATNET and also have had cable for a few years. We are also doing a survey of children.'

Our study does have three phases, a pre- and post-cable survey in one Northwest Arctic village, which I'll call village A. Then we compare village A with two other villages that have RATNET and also have had cable for a few years. We also are doing a survey of children.

The impact of television on children is the major portion of our research at this particular point. I recently returned from about two and a half weeks in village A, then we went on to villages B and C. They are all Inupiat Eskimo villages in the Northwest Arctic region, part of the NANA Regional Corporation. In those villages we replicated some of the tests that were done by University of Alaska Fairbanks anthropologist Norma Forbes in the late 1970s and early '80s when she went in and looked at the social and cognitive effects of television on children. Based on her findings we deliberately selected these three villages in the NANA region as our research sites. One of the reasons is because we wanted to keep ethnicity constant. We also thought that we would get some significant data because of the fact that Forbes had discovered the heaviest users of television at that time were in that remote area. They were Inupiat Eskimos.

She also found an interesting fact that some Native kids had trouble distinguishing television fantasy from reality. So we are looking at some of those kinds of questions again. We are taking a look at several questions that will, among other things, help us determine the relationship between exposure to television and attitudes towards gender roles, towards the village, towards the city, and towards race. I've barely gotten unpacked so I can't give you any real information. Tune in next spring. We went into village A first and spent a lot of time with the eight through twelfth graders there. We gave them a general television type survey, how much they watched, what kinds of shows they like, what they think about television and that kind of thing. Then we did the Forbes tests.

We must remember as we study television that it's only one of many modernization factors in the villages in the last two decades. Any direct affects of television are impossible to answer. We can't measure them, we can only expect to draw some sort of relationship, correlation, between TV viewing and changes in rural life. One of the reasons we asked a lot of open-ended questions was simply because we can't get to that kind of thing unless you ask those kinds of questions. What are the changes that people can tell us they see in their village since they've had television. We asked them questions like that.

Whether more choice means better choice for village A television viewers does remain to be seen. As Larry said, cable is going up in that village within the next couple of weeks. This is a tiny village of 320 people. Cable will be switched on we think by the end of October. Supposedly 54 households are going to be getting cable there. I can tell you that the residents are very anxious to flip from channel 7, which is the RATNET, to something else. Not that they're terribly unhappy with RATNET, they're just tired of seeing the same old thing every day. They're really looking forward to things like 24-hour sports, 24-hour movies and 24-hour news. As the cable was being strung from pole to pole my assistant and I were asking questions. We were literally a couple of households ahead of them. It's unfortunate that they ran into a glitch otherwise we would have seen the immediate effect. It would have been kind of fun, I think, to have been in the village when they flipped the switch and everybody had a chance to stay home and watch 24 hours of movies and probably would have done that.

'We found 97 television sets in those 62 homes . . . 76% have VCRs.'

Village A is one of the last Northwest Arctic villages to get cable. The village is 125 miles northeast of Kotzebue on the Kobuk River. It's accessible mainly by small commuter plane out of Kotzebue, four-wheelers, boats, and foot are the major way of transportation for this time of year. In the winter it's snowmobiles, of course. It is a NANA region village and that means that it is dry. Alcohol can not be brought into or sold in the community. However, it can be consumed there and, yes, they still do have an alcohol problem as they do in all of the Native villages in rural Alaska.

According to the 1990 census 276 Inupiat live in village A. There are three Aleuts and 30 non-Natives. Most of the non-Natives are associated with the public school. Village A Natives depend heavily on subsistence, mainly caribou and fish. It is, however, a pretty sophisticated village. It has a lodge, three small stores and sometimes those stores have some halfway decent fresh fruit and vegetables. It also charges a 2% sales tax on all items sold in town.

Fall is a really busy time of year. Primary activities this time of year are caribou hunting, berry picking, fishing, then cutting, drying, and freezing the food. You see wonderful drying racks of fresh caribou and fish all over town. It's just great. While we were there the weather was sunny, it was warm, it was dry, kids were playing outside until all hours of the night. Weekends were still being spent on the river at fish camp. A lot of men and women in the village were out on a search looking for a missing elder from another village. So going in to measure television at this time of the year was not really giving us very many results. What did we find in terms of how much people watch television? Well, right now they're not watching a whole lot simply because of all of these things going on. But we also know that when we go back in a few months they will be watching more and we know that in the past in the winter they watch more. We can also compare village A against the other two villages and that will help kind of control for that kind of thing.

When the village gets cable it will have a six-channel package including TNT, CNN, HBO, USA, Discovery and Disney. These are all channels that were the most frequently selected from the Private Cable Company that did a little community survey. The RATNET will also be boasted on the cable. Hookup charge is estimated at $85. Cable will then cost about $50 a month. That's the same price villagers pay for running water. A good many of the homes have running water and some have some sort of sewer. The cable system will be owned by the village — many of them in the rural villages are. Eventually a profit comes back to the village. The village has secured a nine-year, $70,000 loan through Microcom of Anchorage. Microcom does provide financing, installation; it trains people to maintain the system on the village level; and then Microcom works in tandem with the Private Cable Company, which provides the programming.

Since I just returned from gathering this data we really don't have much dramatic to tell you. And we certainly haven't taken a look at any of the cultural effect variables yet. We will take a look at some of the things that I was able to literally kind of put together on the airplane as we came back. Just for fun here.

We interviewed one adult from each of 62 households in village A. That was nearly a household census. We found 97 television sets in those 62 homes. Only three homes, and they were non-Native, did not have a TV set. We also found that nearly 76% of the homes in village A have VCRs, which is quite similar to what Larry found. Telephone penetration is less, 61% or 38 homes have telephones. Everybody in the village has a CB. CB plays a very important role from morning when you hear some little Native lady say, "Good morning" to the village and then you hear, "Good morning, good morning, good morning," all over the village. It's absolutely wonderful. And then when the city has things going on or the school is going to do something special or a teacher wants to call a parent or something like that they get on the CB and it goes all over town.

This busy time of year we found that adults still watch a pretty significant amount of television, four and a third hours each weekday. As I said, this will probably be quite a bit higher in the winter. The majority of residents, 77% or 48 out of those 62 adults, use TV for most of their world news and 71% use it for most of Alaska news. Several people told us that radio and television were equally important to them for news. KOTZ out of Kotzebue is very close to being a development station in some ways in that it has a lot of Inupiat programming. It does have news in Inupiaq language, it has Eskimo stories that are run periodically, it has a complete message service for all of the villages. In fact, before I went into the village I spent the day in Kotzebue and I went up to KOTZ and I wrote out a little message and it was broadcast three times a day to tell the people in the village that we were coming in from the University of Alaska Anchorage to do a survey on television and cable and that we were really hoping that they would let us come into their homes. A lot of people heard that message and they greeted us.

'She said she was glad cable was coming in because her kids rent 2 to 3 movies a day.'

We had only one person who refused to talk to us and I think maybe we probably could have worked on him a little bit, too; but he was kind of grumpy and just didn't want anything to do with a couple of women coming in and asking him how much he watched television. We did ask a number of questions about RATNET programming and also how important the RATNET is to them. We even asked if they would be willing to pay $10 a month for the RATNET service. That was a price that was batted around a few years ago — I think over the last couple of years anyway — that the state might want to charge to keep RATNET. Most of the people did say they would be willing to pay $10, especially if it meant that they could keep their statewide news and their statewide weather; the two most important things on the RATNET as far as they're concerned.

Village residents often travel to nearby villages and so nearly all of them have seen cable. Fifty-eight out of 62 that we interviewed had seen cable. That was a little bit high until we realized that a nearby community, just up the river a piece, has had cable for quite awhile. As of yesterday the village city clerk told me that she had received 54 cable subscriptions. That is an increase over the 46 that we found in the surveys. We had left town just a little bit less than two weeks ago. So apparently those people who were not sure they wanted cable or just didn't know enough about it or something are now joining the cable bandwagon so to speak and they are going to get it, too.

We asked those who planned to subscribe to cable if they have to make any adjustments in their household budgets. Seventy-eight percent said they could afford the $50-a-month payment without any sacrifices. Things that may have to be cut from their budget include luxury food items such as ready-made and junk food from the local stores, video movie rental which is $4 a pop out there in the two little local outlets that they have, and several people said that they would probably travel less on their snow-gos and their fourwheelers so they could shift the money that they spent per month on gas to cable television in the winter especially. One family said that they would cut their children's allowance. You know we're talking about one family. Neighbor children don't get an allowance but this is a very culturated family and in fact it was a city clerk's kids that she was talking about. She said she was glad cable was coming in because her kids go out and rent two to three movies a day. That's a lot. People watch a lot of tapes out there. Kids especially are watching a lot of video.

Most village residents we found have some sort of income for part of the year even though it's mainly a subsistence village. And most of the people said that they thought $50 a month was very reasonable. The obvious reason for subscribing to cable, of course, doesn't need a survey to tell us. It's more choice. And as I said people also are very interested in 24-hour news. The only newspaper they get out there on a regular basis comes every two weeks, not once a week, every two weeks and that's the *Arctic Sounder* and they get very little news statewide out of that. Basically it's a regional newspaper out of Kotzebue. They also want more sports, different sports. They really want to see boxing. They also want more movies, newer releases and all-night movies.

Our question, "Why do you want cable?" also produced some answers that we had not predicted. That was Christian TV. Many of the elders told us that they want to see gospel and they want to see Christian television. We also heard country television — that was one a lot of people asked for — educational TV such as Discovery channel, and one person even said he was getting cable simply because he thought it didn't have any commercials. Unfortunately all of those people are going to be highly disappointed because they're not going to get a Christian channel and they're not going to get a country music channel. But they will get Discovery.

The village was one of the first rural villages in the state to get the RATNET in 1977. Many things have changed in the village since then so we asked an open-ended question: How were peoples' lives different before they got TV? We did get a variety of answers. I tried to lump them into these categories. People said they did more as families, they worked together, they played together, they camped together more, sons and fathers did more subsistence hunting together, daughters and mothers worked more on household chores and they also worked more together on subsistence food gathering. In fact, every family told us that they did many more subsistence type activities before television: fishing, hunting, wood gathering, tracking, berry picking, making repairing nets, making baskets, all those kinds of things. One woman described it this way: "We were healthier, we were less lazy before television." Kids played outside more before television, they played more

Eskimo games. Some who remembered when television came to the village said that kids started acting out what they had seen on TV, for instance, playing cowboys and Indians. Before television, they said, children got more rest, they did more school work, they performed better in school, and they were easier to control in school. Villagers also said that they visited each other much more before television, they went to more community and school activities and they went to church more. In fact, now we find that when they have a community meeting it's usually at a time when there's not a great show on because people will be home watching the show rather than coming to the meeting.

We asked a similar question, "How has TV changed life in the village?" and we found that people said it gives them something more to do indoors than they had before. It's become the children's baby-sitter, of course. It keeps them out of trouble; that's according to young parents. But then you listen to the grandparents and the elders of the village and they say that kids fight more, they steal more, they vandalize public property more since television has come on the air and they believe that kids are acting out some of the violent things they see on TV. All people told us that they thought village kids watch too much TV and they all told us that they thought TV violence was a problem for children. But they also told us that they didn't have any rules in their household about what the kids watch, be it VCR or TV. Many people note that television has given children role models they've never seen before in this Eskimo culture, particularly professional athletes. Teachers said that they've noticed that children speak much more grammatical English since television has been in the village. A lot of older women, elders, told me that they have learned to speak English from TV. One woman said, "I watch 'Price is Right,' it teaches me numbers. I watch 'Wheel of Fortune,' it teaches me English."

Many people, of course, say that television has speeded up the cultural confusion in an already changing society. It definitely accentuates the differences between the haves and the have nots. And this is basically a have not culture. We go back to the village sometime yet this winter. I'm not exactly sure when since cable has been a little bit delayed. We want to give some time for the novelty effect to wear off although we do expect to see a novelty effect for probably at least a year. We will go into villages B and C in November to do a household survey on young adults and to survey kids there on their general attitudes towards RATNET, towards cable, and some of the cultural variables. Maybe a little bit later we'll have some time for questions if anybody has them. Thank you.

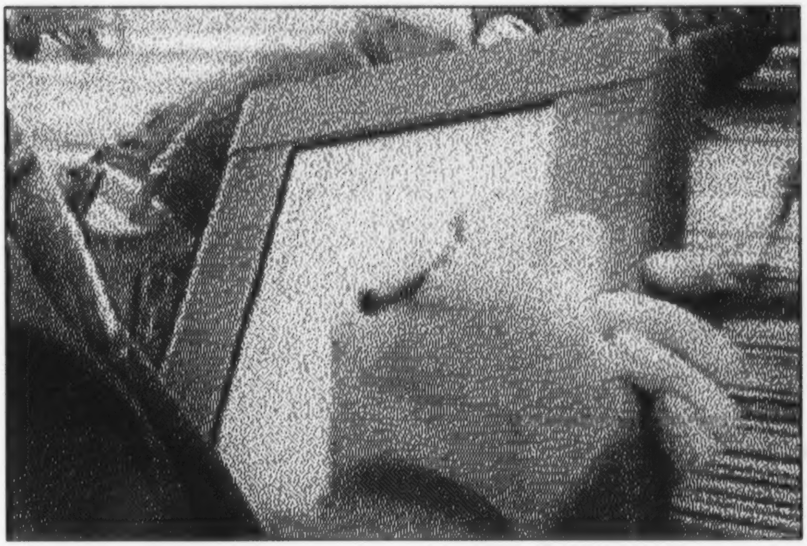
PEARSON: The third person from the center is Doug Franklin who will talk about something entirely different. Doug is our information resource coordinator. He's a lifetime Anchorage resident. He went off to MIT in the early 1980s where he received his degree in earth and planetary sciences. He spent a couple of years after graduation in the Cambridge area in the software and hardware development environment working for various companies there. He's been a marvelous person to work with because he's extremely creative and we've had lots of fun brainstorming, talking about ways in which we might adapt technologies to meet the particular needs of Alaskans. His particular interests include geographic information systems. Before coming to the Center for Information Technology, he worked for British Petroleum and for the Cominco Red Dog Mine. He also writes science fiction which has been published in *Aboriginal Science Fiction* magazine. As a high school student in Anchorage he was a presidential scholar. He claims that he's one of the few former haul road drivers who have never wrecked a vehicle. So he brings that experience also. Here is the next presentation.

DOUG FRANKLIN: I have a somewhat different background than Larry and Rosie. When someone says "program" to me I think about software development, not television. But we're doing a couple of projects that are of interest particularly for geographic information systems.

This presentation is in Hypercard because I am more comfortable, by and large, with computers than with paper. It's a sad comment on modern times. One of the things we're working on is a project called WayPoint. WayPoint is a geographic information system and we are currently looking for Alaska Science and Technology Foundation grants to fund its development. It looks like about a five man-year project because it is somewhat complex. The whole point of the project is to develop software for notepad computers. And that brings up the obvious question: What is a notepad computer?

The picture you see here is of a prototype by GO Corp. in California. The characteristics of notepad computers are that they are very sturdy and have a monolithic construction much like the regular notepad. They can be used virtually in any environment. They have a stylus for input instead of a keyboard, which means you can use them standing, sitting, at a bar, or in a car, anywhere really. They have a large LCD surface on the front on which the stylus writes, so it's very much like using pen and paper. They are very lightweight and they have internal handwriting recognition including signature verification, which brings up a lot of interesting possibilities for applications that could never be automated since they required signature authorization. You may have had UPS deliveries where the man brings a notepad in and you sign it and it's all electronic, there are no paper transactions involved whatsoever.

GO's prototype used the Intel 80286 chip which is technospeak for a sort of late generation item. You find them in IBM ATs. As a result it was a little bit slow. We had one in for a week of evaluation. It was quite enjoyable; it did what they claimed it would do. You could write on it



and it would translate your writing. It took printing, not cursive; cursive is much more of a problem to solve. The next generation of machines will be based on the 80386 chip, and that should solve a lot of the speed problems that we saw with it.

GO is only producing prototypes. It isn't producing production machines. Its business is software; as far as it is concerned, it wants to be the next Microsoft. It wants to be in position where it can sell operating systems, and hardware is really sort of a low margin item. It takes a big company to be successful at it. Like, for instance, IBM that you see there on the list, and GRID and NCR. IBM hasn't shown what its notepad is going to be and I'm very curious.

NCR has a 3125 model and it seems to be a very good machine. It's based on the 386 and it's tailored to run a variety of operating systems. It uses the stylus down there in the corner of the picture. The stylus is important, by the way, for those of you who might have been wondering. It uses an interesting technology to work and it's quite effective. The only problem is that if you lose it you are kind of out of luck. It's not like a pen or a pencil; the notepad won't operate with a finger or a mechanical pencil.

One of the really intrinsically important things when you start to do development for these machines is how much memory they've got. I'm used to working with Macs and IBMs that have 80 megabyte hard disks and 8 megabytes of memory, and that just doesn't happen with these machines.

'Notepad computers can be used in virtually any environment . . . They have a stylus instead of a keyboard'

We find machines that only have RAM, or perhaps a combination of RAM and FEPROM, which is another buzzword that I only recently learned the meaning of. It means Flash Erasable Programmable, Read Only Memory. It's very much like an optical disc or a worm drive but it's silicon. You can erase it, but it erases in blocks. It serves as a long-term nonvolatile storage; it's like a silicon hard disk.

The NCR 3125 also has an option where you have a hard disk drive for permanent mass storage and that's this option up over here. You can get the RAM and a hard disk and expand it up to put more RAM if you want. This is a system that we're looking at acquiring for our development work because for some applications you want to have that mass storage, especially for GIS's.

There are different ways to go about the task, and most of them center around communications options, which is why NCR's FAX modem is rather interesting to us. If you don't have much memory and you are interested in large amounts of information then you want to tie in to somebody who has the storage, who has the data. And this modem will allow it to do so. Unfortunately, it's only really a portion of the solution because it requires getting wire between your notepad and the machine that has the information. There are other developments out there that do as well, cellular modems, and Motorola has announced an ARDIS radio packet expansion to the machine as well, which means that you can subscribe to the ARDIS network and have national access to servers.

I did a little research, since that seemed interesting, and I was shocked that ARDIS is extremely expensive. Especially if you are transferring bulk data, like a megabyte image or map. It costs about $100 to transfer a megabyte, which is unreasonable for applications that require that kind of information in bulk on a routine basis.

Digital narrowband transceivers, which was at the bottom of that list, are in use by UPS for its notepad. No one has announced them yet for consumer notepad but it seems a matter of time. For local area networks Sitka has a product

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called TOPS that people who've used IBM PCs may well be familiar with. And it is producing an adaptation of that for notepads. Photonics has an infrared LAN which does not require wires at all, which again is a consideration because if you have a portable computer like a notepad you want to cart it around with you wherever you go. Novell has also announced some interest and it is negotiating with some of the operating system vendors to build Netware modules.

Other possibilities for expansion include a global positioning receiver and an electronic compass which will tie in shortly to the project we are concerned about.

'You can edit your spreadsheet even though it's embedded in a word processing document.'

The Global Positioning System is a system of satellites launched by the Department of Defense that allows you to pinpoint your location within a few meters on the Earth's surface. It is used widely by pilots and hunters and fishermen. There are expansion cards out for laptop PCs that have GPS receivers on them. So it seems a matter of time before you have it for notepads as well.

The electronic compass is slightly more off-beat. It is not, to my knowledge, on the market at all at this point in time, but it's a relatively simple device that you can use just like a regular compass, except that you can tie it into software. So, the software knows which direction you are pointing the notepad as well as where it is located.

There are several operating systems vying for notepad markets. Pen Operating System by NCR is just an interim solution and it will go away because it's not competitive. Windows for Pen Computing is interesting because Microsoft is playing a game to capture the pen operating system market. Windows for the pen does not really exist in a useful form as yet. It will be layered on top of DOS just like regular Windows. PenPoint by Go Corp. is a new, modern operating system that is very attractive for reasons we will go into further. And then there's research performed by Xerox PARC which, of course, is a major player in the idea market. It has done some very interesting things with graphical user interfaces, and will do so with notepads as well.

Pen Windows, as I said, is a product that is actually layered on top of regular Windows which is layered on top of DOS. As those of you who have ever had the pleasure (and I say that sarcastically) of configuring a large number of Windows machines know, it becomes a rather arduous task, and it doesn't appear to get any easier in this case. However, its strength is in applications. If you have Microsoft Word for Windows, if you have LOTUS, you could take that and put it on your notepad and use it immediately, which makes it very attractive for many people. But the backwards compatibility that Microsoft has striven for imposes a lot of limits on what you can do with the technology.

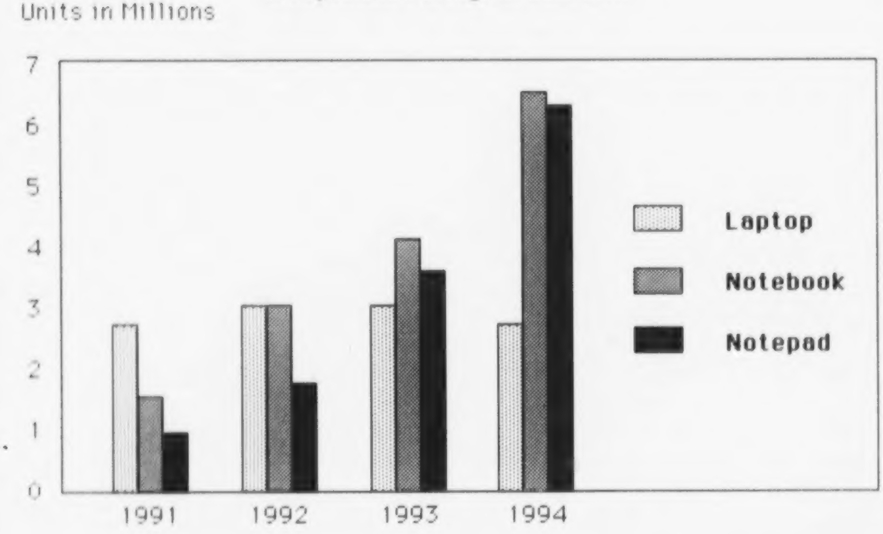
The PenPoint operating system is a new start. They have taken an interface somewhat like Apple's, but optimized for pen usage. We got a look at it and it's reasonable, it's not a bad operating system for the first pass. No doubt it will get better as time goes by. It does some really neat things for you, including something called embedded document architecture, which is a long way of saying that you can embed anything in anything else. If you have a spreadsheet you can put it inside a word processing document. If you want you can take those two and put them into a page layout document. And those are all live; it's not a static copy of the original document. And it's not like Apple System 7 where you have to publish and subscribe and use artificial mechanisms for keeping those applications embedded. It's right there, you can use your native tools to edit your spreadsheet, for instance, even though it's embedded in a word processing document. So it's extremely transparent, very nice technology and it's leaps and bounds ahead of Windows and the Apple Macintosh operating system as well.

The PenPoint operating system supports mobile connectivity which is the key issue again, because these systems are ones you want to cart around with you. You don't really care much about mobile connectivity if your computer sits on your desk all of the time. You might as well just use what you've got. But this has internal support for the idea that you are going to be connecting notepads up to networks and taking them off networks over both wires and wireless mediums, either way.

PenPoint's scalable implementation is interesting in a future sense. Right now we talk about notepads which are the form factor of a spiral notebook. Scalable implementation means that an application will work just as well with wall screens, with credit card sized machines, with calculator sized machines; anything you can think of, really, will work with this particular operating system. And the applications won't care. If an application will run on one PenPoint machine, it will run on any of them. Which means you can use it in a classroom for taking notes, or you can use it at a corporate presentation as the thing that you write on. It really doesn't matter to the operating system unlike, for instance, Pen Windows.

And finally, PenPoint is object oriented, which is important for programmers. It means that you can get a lot of extra productivity; you can reuse your work. You aren't stuck with what you did in the past. Or, to put it differently, you're stuck with what you did in the past but you're happy about it because you can use it over and over again.

Now Xerox PARC is looking at this technology and I highly recommend, like Kay Brown, that you look at the September '91 *Scientific American* if these issues interest you. They have a concept, what they call "ubiquitous computing." Their idea is that computers, thus far, have sort


Projected Notepad Market

of gotten in the way. What they would like to see is computers fade into the woodwork so you don't even really notice them. Right now this computer is tailored actually for Rosemarie Alexander and I'm using it and I have to load my stuff onto it and then I give it back to her and she's going to load her stuff back onto it. With ubiquitous computing you don't care. It's a tool that you use and when you do come up to a computer that computer will present you with your stuff. You don't have to worry about it.

To implement that vision requires two things: it requires a large variety of computers just floating around, your notepads, your white boards — your live boards, as Xerox calls them — and what they call Tabs which are the little guys that fit in your pocket. And all of those have to be hooked together with wireless networks in order for this concept to function properly. And it appears to do the job.

They have a system running at their research center which is quite fascinating. You can imagine just walking up into somebody's office and sitting down and the computer automatically presents your documents to you. They know you are there. The Tabs have infrared emitters in them that identify you. So you wear a tab like a badge, like a corporate ID badge, and that does the trick. Now there's a lot of different people who might be interested in using this kind of technology. People who don't have the luxury of sitting at a desk all day, like myself. Insurance adjustors, health care workers, delivery people, all the way down to students and pollsters and field engineers who are out all day doing things away from their desks.

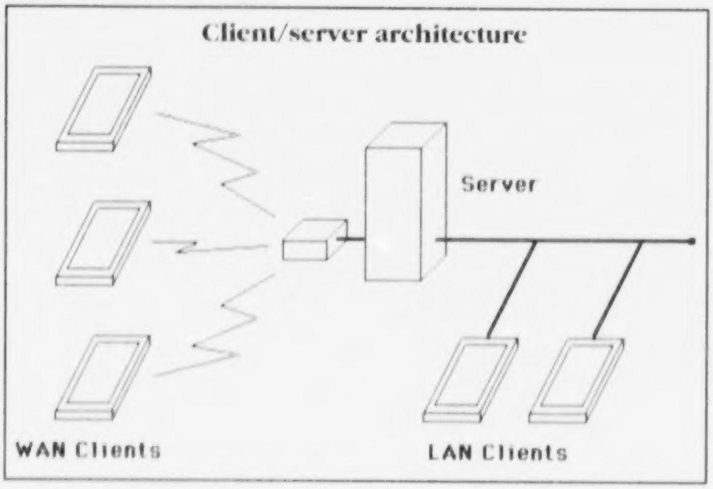
The projected market for this is substantial. A survey that was commissioned by NCR shows a rather steady climb for notepads up through '94. '93 is projected as the point where it becomes fiscally advantageous to be in the notepad software market. But that's okay because its '91 now, and that's two years away. So there are about 40 large companies that are developing software for notepads at this point and most of them are aiming for introduction for their products in '93, because that's when there's going to be a lot of hardware out there.

You can see by the graphs that notepads are expected to outstrip laptops pretty quickly. Laptops are sort of a deadend in an evolutionary sense because they're just like desktop machines except slightly more portable, whereas notepads are a different proposition entirely. So the market looks pretty good, but of course the survey was commissioned by people who have a stake in this type business.

Target applications in the near term are automated forms, the kinds of things that you can do by checking off entries, by picking things off of a pop up menu. Official documents are a big potential market because you can sign these as a notepad-based document and it counts legally. And that opens up a whole slew of applications, especially in medicine and law enforcement, where you have to verify that you have seen or generated some piece of information by signing the form it is on. Another thing you can do with electronic signatures is control access to databases. With notepads, you can do that with a signature instead of with a password, which is somewhat more natural and rather more foolproof as well.

We are interested in developing software for notepad computers, and when we started thinking about what we would like to do there were practically an infinity of possibilities. So we decided we wanted to concentrate on the Center's areas of expertise, which are telecommunications and geographic information systems. And we wanted to produce commercially viable software because of funding problems which should be obvious at this point. We want to target new markets because, if you get there first, you can establish a share that won't go away for a long time. Whereas, if you come in after the curve has peaked, say in '94 or '95, a lot of other people have already got their slice of the pie and you have to fight for your much smaller share. If you come in first you have a better chance of capturing the market. And, of course, we want to contribute to the local community.

So starting with those goals we came up with a project called WayPoint, which will be used to enhance access to existing ARC/INFO databases. ARC/INFO, to back up just a bit, is a geographic information system that is extremely common in Alaska. It is pretty much the standard in this state.


Client/server architecture

We intend for the application to have a modern client/server architecture. That means that the notepad will expect to be talking to another entity, a bigger generalized computer that will be dishing the data down to it, instead of being a stand-alone system. PCs are designed by default as stand-alones.

WayPoint is designed to cooperate with other machines. It will operate off of an internal hard disk, over a local area network, or over a wide area network. This means that it can be used for many different applications. For some applications there won't be a network. There couldn't be a network if you were out in the mountains, for instance, doing geophysical exploration. For some applications you want traffic data, so you're going to be tied into the city's server. WayPoint will be relevant to Alaskan concerns because we are a relatively mobile state.

As I said ARC/INFO is pretty much the standard GIS here. The ARC portion handles graphical data, the INFO portion handles tabular data. It runs on a variety of host platforms. We are targeting UNIX because it's very open. Most of the GIS users in this city are heading towards UNIX if they aren't there already. In particular, the municipality's Public Works Department, which we are talking to, has its database running on a UNIX platform.

The client/server architecture breaks things up so that you can have remote notepads, you can have notepads tied in, or you can have stand alones, and they all talk to the server and the server talks to them. The projected uses of the software are natural resource development, environmental assessment, utility construction, maintenance, urban routing — for instance, when you have traffic problems and you want to find out where the jam is or where the potholes are pulling the traffic into a tight little knot. You can use the software to download that information in your car. And wilderness navigation, for those of us who enjoy getting out of the city, or whose job is to get out in the wilderness.

The users are relatively obvious in these categories. Emergency services could use it for routing, for finding where they're supposed to go. Same deal with taxi drivers, essentially.

Real estate agencies have a particular interest in this. I've been over to a couple of them in town and they use databases, but they are constantly having to return to the office to get the latest picture: what's on the market, how much does it cost. With a notepad running WayPoint, they could take that information with them and use it all the time. It would have the maps and the database access that they use. Utilities, oil and mining exploration companies and, of course, the whole slew of outdoorsmen would also have a use for it.

If you have any questions about notepads in general or about WayPoint in particular I'd be happy to answer them now.

AUDIENCE MEMBER: Can you tell us more about the difference between notepad and notebook computers apart from the way they work.

FRANKLIN: That really is, in essence, the main difference. I guess you could call this computer I'm using for the presentation an overgrown notebook. It is semiportable. A notepad does away with the keyboard entirely so that you can use it with one hand, standing up. A notebook, despite its diminutive size, requires that you have a lap to put it on. You've got to be sitting down to use the thing, or standing up at a counter, and it requires both hands and your full attention. A notepad computer's form factor is like a spiral notebook, and you can use it standing up and write on it very naturally. You can use it at construction sites, for instance. You can use it in dirty environments because there's nothing to get jammed into the keyboard. That's the primary difference really; there isn't a keyboard.

AUDIENCE MEMBER: (inaudible question about use of notepad computers in police work.)

FRANKLIN: Yes, in fact, the San Jose Police Department in California is on a program to buy notepad computers from Grid. And that's what they do with them.

AUDIENCE MEMBER: Currently they go through dispatch so they make a radio call and wait for them to return their call.

FRANKLIN: One of the things that's trumpeted about notepads is that it moves data collection to the user instead of having intermediaries, like you do in most businesses, where you have somebody out in the field collecting the data and then you have to take it all back to the office and then you have an intermediary who transcribes it or copies it in some sense. It does away with the intermediary entirely, which means you don't have to go back to the office and you don't have any transcription errors either.

AUDIENCE MEMBER: Would you clarify? What sort of graphic images do notepads handle? Can you get strictly line drawing or get a photographic display?

FRANKLIN: You can have a variety of image types. In this particular project, ARC INFO and WayPoint will support both raster data, bit maps of pictures, and line drawings, the vector data. So, the difference really is how much time is required to transmit the information in the graphic image.

A megabyte of data going at 4800 bits per second is about half an hour, if you really want to sit and wait for that to come over a phone line or radio link. A line drawing of the same object might be just a few hundred bytes which would go over before you even noticed the fact that it's happened. So we will probably work mostly with line drawings because of the limitations of the communications mediums right now. But theoretically it will handle either kind of image representation.

The notepads that I've seen have VGA-quality screens. They handle 640 by 480 pixels and 16 colors of gray. The new machines will probably end up being color. Color flat-screens are already on the market for laptops, and it won't be long before it's a desirable feature to have in notepads as well.

DAVIS FOULGER: Well, one thing to watch on that is reflexivity between image and a line drawing. There's an increasing number of vendors that have software who will take an image and turn it into a line representation. Once you've done that then you really have the best of both.

FRANKLIN: Right. There is a variety of different kinds of data that ARC INFO commonly uses, from raster satellite imagery all the way down to something that somebody has painstakingly drawn. The vast majority is really stuff that people draw, utility plots, roads, pipelines, that kind of thing. But when you want up-to-date information, perhaps airborne or satellite — of the cause of a forest fire, for instance — you want a picture. You end up transferring the picture, or as Davis suggests, transforming it and compressing it down to a better format.

Emerging Issues in Access and Dissemination of Government Information

It's great to be here. I've actually been here once before. Trying to get to Juneau, I came here. Actually I came here trying to get to Juneau after I'd been to Fairbanks. I went back to Seattle twice and I finally arrived in Anchorage and I called Rep. "Red" Boucher because Rep. Boucher's committee and Rep. Kay Brown were holding a hearing, and I was supposed to be at that hearing three days before that night. They said, "It's real simple — get off of Delta and get on to Air Alaska." Voom, I got right into Juneau. It's really a pleasure to be here. I'm very excited about it. I want to thank Larry. I want to thank Rep. Kay Brown and Rep. "Red" Boucher. Kay and I have had a number of interactions with the National Council of State Legislatures. I'm kind of a ubiquitous speaker. You talk about ubiquitous computing. I'm kind of a ubiquitous policy guy. They kind of prop me out and I only foam at the mouth and scream and yell and talk about access and dissemination and one thing or another. I'll try not to do too much of that today.

This has been my six weeks to be on the road. I have been at the Electronic Democracy Conference that was held five weeks ago in Washington, D.C., a fascinating conference. I think it's indicative of how the technology is really beginning to slide into the way we do things, and people are now looking at questions beyond how do we automate to how do we actually govern and what are the implications.

I've been at the National Council of State Legislatures meeting where we had a one-day special session for legislative members and staff talking about some of these policy issues. How can states and state legislatures deal with these problems of privacy and access and dissemination? How are we going to build these systems? How are we going to make them work?

Many states including the state I now work in, the State of Washington, have a history of very large computing projects going down the tubes. There are some real consequences that fall out of that, including the governors not winning re-election. But what I'd like to say about the NCSL meeting is that at one point Bob Smith, who some of you may recognize as the publisher of the *Privacy Journal*, stood up and said, "I want the people in this room to understand that you have made a difference" because Equifax and Lotus had announced the week before that they were not going to put out a CD-ROM product that had all of our names and all of our purchasing habits on that. One of the reasons they did that, according to Bob Smith, was because legislative people were coming up to speed, because the NCSL had had a number of meetings on these issues, and because 30,000 letters were generated to Lotus and Equifax from the Internet. People on the network writing each other electronically had generated so much interest in this particular "invasion of privacy for information products" (call it what you will), that this major corporation, this venture of Lotus and Equifax really backed off what I think was potentially a very significant impact on all of our privacy.

The NCSL, the Electronic Democracy Conference, I then spent a week with the IBM people. That's always wonderful when you do that. You go to New York State, you go to the Palisades, the food's wonderful, the teachers are all from Harvard, there are all these Harvard business cases, and what you learn is that it works. I mean it doesn't always

'Our constituents, the people in this room, the public citizens, are interacting every day with organizations that use technology.'

Ed Levine

is the senior policy coordinator for information technology in the Office of Financial Management for the State of Washington. He is vice-chair of the National Conference of State Legislatures committee on access to information. Previously he was staff director of Florida's joint legislative committee on information technology resources.

work, but in general it works. They're very sophisticated, they don't use IBM, they don't talk about the product, but the point that they're making is that in very large organizations we're seeing people use technology to change the way they do business, to increase their profits, to have a strategic advantage.

When somebody asked Kay yesterday, "What do we do and how will government change?" one of my responses is that in many respects our constituents, the people in this room, the public citizens, are interacting every day with organizations that use technology, be it an ATM, be it their cable network, be it phoning up and ordering merchandise from a mail order catalogue, where somebody answers the phone and says, "Hello, Ed, how are you? You haven't called us in six months. How is that parka working out? It's nice to hear from you again." And what I'm suggesting is in fact that the technology is virtually everywhere.

I've got a couple of quotes I want to use, and first let me quote for the librarians. Are there any librarians left in the audience? A couple of you, okay. F.W. Lancaster, writing in the *American Librarian*, had a wonderful essay (actually he had two of them). One was called "The Paperless Society" in which he said, "You know, the world is going to change, and we're not going to have paper." And he caught a lot of flak. I mean he *really* caught a lot of flak from this. Twenty years later he wrote another article called "The Paperless Society Revisited" in which he said, "You all laughed at me; ha! ha! I have the last laugh." But the quote I'd like to use is the one where he says, "Look, just because I write about an electronic society does not mean that I'm enthusiasfically looking forward to it." And so I'll leave you with that.

Another quote that may be more appropriate for some of our government people. From Thomas Jefferson. "Enlighten the people generally and tyranny and oppression of body and mind will vanish like evil spirits at the dawn of day." The positive side about the power of information. Let me balance that, and it's a quote that I hesitate to use because it's always been so depressing to me but I think it brings home the point. Hannah Arendt writing on the human condition: "The trouble with modern theories of behaviorism is not that they are wrong but that they could become true, and they actually are the best possible conceptualization of certain obvious trends in modern society. It is quite conceivable that the modern age which began with such an unprecedented and promising outburst of human activity may end in the deadliest, most sterile passivity history has ever known." I think that's certainly the sort of possibility that exists, with kind of the 1984 take on computers and the way they control us.

Well, this presentation is going to try and balance both of those, and I run hot and cold because I hear some of the things that are going on both in Alaska and elsewhere, and I get terribly excited about the possibilities of the technology to transform the way we live, the way democracy works, the way government works, the way we will make our living. Then I read about and think about some of the possibilities of control and how this technology *potentially* can control us in many, many ways. If you've followed some of the issues of workplace monitoring, for example, you can clearly see that the technology is potentially dangerous to us as well. I think we have to balance those kinds of things. So I run hot and cold, and what I'm going to do today is to be like your worst nightmare — I'm your economist who says on the one hand it's great *but* on the other hand it's not so great.

There are a couple of things I want to talk about. First I'm going to talk about technology. I'm going to talk about what's happening to the technology and how it's changing. Then I'm going to talk a little bit about how society is changing as a result of the technology and how organizations are being transformed by that. Then like Arlo Guthrie's story we talked about how the garbage got down at the bottom of the cliff, in order to tell you another story I'm going to tell you another story. The other story is about privacy, it's about access and dissemination, it's about security of government information systems, and if there's any time left, I want to talk about archives. And, finally, I want to get to the issues of democracy and how I think government can work.

'One way to think about this is buying a Rolls-Royce that can go around the world 3 times on $1.98 of gas for $10.'

So let's start off with some quotes about what's happening to technology and how it's changing, and I think the easiest way to describe that is faster, easier, cheaper, quicker. Here are some computing cost comparisons. In 1940 it took $1,000 to perform a million operations and it took one month to do it. In 1952 it took $300 to perform a million operations and took ten minutes. In 1960, $75 per million operations; it took one second. In 1970, 6¢ per million operations in one-half second. In 1980, 1/10¢ per million operations, 1/10 of a second, and they say by 1997 costs will decrease by a factor of 100. Okay, one way to think about this is buying a Rolls-Royce that can go around the world three times on $1.98 worth of gas for $10. I mean that's the kind of comparison that you have to think about with what technology is doing. There was a comment earlier that Herb was making I want to talk about — why isn't there productivity with computers? Well, one reason is that it's just too damn hard. It's just too hard to use these guys. One possibility is as they become faster and as they become stronger, instead of having the keyboard we could use portable computers and potentially we're going to interact by voice. When we start interacting with voice, you may see that people use computers a whole lot more, and we may see some things happen with productivity.

Okay, let's see if we can't get beyond and get more specific about this. Larry yesterday talked about how the computer and the TV screen are pretty much becoming the same thing. I have a quote here somewhere if I can find it that I think talks about that, and maybe I don't. Well, I guess I don't. But I do have some other thing which is the network is the computer. *Business Week* says, "What's really happening today is instead of using computers, we're actually using the network." Processing power continues to drop by 50% each year and by 1999, a man named Gilder, writing in *Harvard Business Review*, says, "a powerful work station performing 15 mps and commanding 16 megs of RAM will sell for about $350." Basically it's going to become free. That's the world I'm looking for. Bottom line — faster, cheaper, easier, network and connective. So I look for the technology to become ubiquitous in every way, and I'm interested in that happening because then we can stop talking about technology and talk about more interesting things. Let's talk about some of those.

MIT has just completed a seven-year study of the corporation in 1990. It looked at ten major corporations in America — it looked at the U.S. Army, it looked at the IRS. Unlike the situation that Herb was talking about in England and I guess in New Zealand where business colleges or universities don't spend much time with business, MIT makes a living doing this. It goes into a business and spends a lot of time with them. So MIT got together with AT&T and BP and a number of other major organizations and said, "Look, let's find out what's happening to corporations as they start to use information technology." And it's a fascinating thing. First, let's talk about how to define information technology — hardware, software, the network, the work station, robotics, and smart chips (smart chips are those things that control your braking system that you have in modern cars). So I.T. covers all of these things. I would add something that somebody said here today — was it fleshware? That bothers me. How about wetware, or peopleware? But some sense that in fact in addition to the hardware, the software, the network, that people are part of this as well. So MIT looks at these corporations and looks at the impact that information technology is having and it says, "You know the world is changing and the nature of work is different."

Let's see if I've got some quotes that can help us understand how in fact it's different. One of the things they find is that the nature of work is changing, that the way we do things is quite different than it used to be. One of the examples that IBM uses is Mrs. Field's Cookie Company. What's different about Mrs. Field's Cookie Company? What's different about Mrs. Field's Cookie Company is ....has anybody here ever had a Mrs. Field's cookie? Some of you are nodding your heads up and down. Mrs. Field is a corporation. They bake cookies. They bake them all over America. But there are two people who are pretty much running the operation, and they do that because they've got computer linkages to all these places and they are able to track how people are selling. If you work for Mrs. Field's Cookies, she knows pretty much what you're doing all the time and so it's not surprising if you get a message on the terminal that says, "Ed, go out and sell more cookies. Go out and bake some cookies and show them to people."

That's the kind of control that would *really* make me crazy. Nonetheless that's possible.

There is a quote from Shoshana Zuboff that I'd like to use from her book, *In the Age of the Smart Machine: The Future of Work and Power*. Zuboff basically says that technology makes the world a new place. Peter Drucker in his book *The New Realities* says, "A great deal has been written these days, almost too much, about the impact of technology." He suggests that the real impact of technology has very little to do with the hardware but has a great deal to do with the impact on society, and he says that "a great deal these days, almost too much, is being said and written about the impact of information technologies on the geo-civilization, on goods, services and businesses. The social impacts are, however, as important, indeed they may be more important." Some of the social innovations of the industrial revolution — the modern army, the civil service — surely have had as much impact as the steamship and railroads. The present age will be remembered as much for social innovations and politics, government, education and economics as running new technology.

'I do think we're going to see some significant changes in the way government works.'

First, technology does make the world a new place. Secondly, governments are no different than organizations that are doing this. Juan McFarland writes about how organizations are being nuked by technology and he says that one of the things technology allows us to do is reach down into the organization and see what's going on, to communicate much more directly. He then talks about how the technology is going to empower people. One of the things that I would like to talk about is the empowerment; he's talking about allowing people to talk directly to one another. The Mrs. Field's cookie case is part of that.

One of the things that happens is that we flatten the organization's pyramid. Organizations are using the technology to break down the hierarchy. The Office of Technology Assessment has been suggesting that we are going to see many fewer knowledge workers, in fact we're going to see fewer people involved in doing technology, that we're going to be much more efficient and much more effective. I think that's going to happen to government as well and, as I look at government, it's clear to me that we are seeing fewer people needed to do this. The quote that I'm finally back to here is from George Gilder who says, "Look, the computers are changing the way that organizations work."

Let's talk about that. He says the first computers enabled companies to become or go on being hierarchical and centralized. The new technologies in contrast allow for the evolution of peer networks. The technology would decentralize control and empower people all along the information chain. It will dissolve conventions of ownership, design, executive style and national identity. Well, I'm not sure about whether that's going to happen or not, but I do think that we're going to see some significant changes in the way government works. The MIT people argue that because of I.T.'s impact on production, coordination, direction and control, because "any information in anytime, anywhere, and anyway I want it" may become possible, then the organizational structures and practices do not have to stay the same as we move into the '90s.

Okay, if I can get anything I want from technology, if I can be at my computer and access any database and any application to which I am entitled, then the way we've organized today is not really necessary, and I look at that in terms of state government where in fact we have built statutory relationships. What an agency does very often is based on the law. That may or may not allow us to deal with the public policy issue. For example, drugs in our high schools. When I think about the way in which we have organized to deal with public policy issues, the reality is that they do not mirror the way problems happen today.

One of the things we found in Florida was that if you wanted to deal with an issue of drug abuse in a high school you couldn't get there from here because law enforcement had one set of data, the people who were doing social services had another set of data, and the educational community had a third set of data. That meant it was virtually impossible to share information about who was in fact the problem and how to deal with them. We don't have to do that. We no longer have to sit there and think about vertical pipelines of information, we no longer have to think about the ways in which the statutes force us to operate. The technology allows us to reconfigure these things on the fly. It is not always easy, but the private sector stuff that MIT has done has shown it is possible to think about using technology to reconfigure organizations.

Now one of the interesting things that's happened, and this is back to Herb's point, from 1980 to 1990 corporate America spent $98 billion buying PCs. All right, they bought 57 million personal computers. White collar output has remained absolutely flat. From 1960 to 1990 white collar output has not changed despite the fact that we spent $97 billion on it. That's an interesting comment and it goes back to the point that was being made about training or how hard are they to use. Nonetheless, it's my sense that as these organizations and as the private sectors have been demonstrating begin to use the technology, we're going to see some changes.

Shoshana Zuboff does say that technology does make the world different. There is a quote from George Dibold in his MIT study that "the most important thing that's transforming society is the information technology." The quote from Drucker basically talked about the fact that it's not just information technology or changes in technology, it's changes in the institutions of society, too. He says the industrial revolution was important for steamships, sure, and railroads, but it was also important for civil service and the post office as well.

The point I would make is that technology becomes easier to use; we *are* changing the way we do business, we *don't* have to have organizations the same way they are today. We can think about reconfiguring them and the competitive pressures to make them smaller as well. The Mrs. Field's cookie case was designed to talk about the fact that two people basically are able to look out over hundreds of stores and make a change.

> **'For a long time there was a feeling that privacy was dead as an issue.'**

If you spend any time studying this stuff you always hear about the American Hospital Supply case. I am so tired of hearing about the American Hospital Supply case, but that's an example where they put terminals in the purchasing facilities of hospitals, and the market share went up for that particular company. Frito Lay now has personal computers that they have put into their delivery trucks. All examples of using technology to change the way you do things.

My position is that this is going to happen to government, that as we use technology, as more and more things are automated, government is going to have to do the same. In fact most of us work and live in states, and I think Alaska is no different, where the state could not do business if there was no technology. If we couldn't collect the revenues, if we couldn't direct the law enforcement officers, if we couldn't print the paychecks, there are a number of ways in which you could make the argument that without technology state government and local government come to an end.

Okay, this is the story I told you to get to the second story. Let's talk about some of the impacts on at least four policy areas — privacy, access and dissemination, security, and archival stuff.

I think the interesting thing is that privacy is back. For a long time there was a feeling that privacy was dead as an issue. Even the people at the ACLU were making the argument: Let's not really talk about it, there's nothing we can do about it, we've lost control completely. There is a famous chart that Bob Smith has in a number of his books which is kind of Rube Goldberg, and you see that there are all these connections between privacy, between institutions, between the draft boards, between Social Security Administration, between the credit bureaus.

There is this wonderful story about a young man who wanted to get a free ice cream cone, and the ice cream parlor in his town always gave kids free ice cream on their birthday. He and his friend invented an imaginary playmate named Tom Jones, and Tom Jones had a birthday on such and such a date, and they got a number of free ice cream cones for two or three years and forgot about it until the draft board sent a notice for Tom Jones to come and appear. Well, what had happened of course was the mailing list of the ice cream store had been sold to the people who do selective service.

It's this kind of connectivity that I think we're all aware of because all you've got to do is order one piece from Eddie Bauer or from those wonderful people in Maine and the next thing you know is that you have seven catalogues. So it's pretty much assured that privacy, at least in America, is pretty difficult. I had written privacy off as a public policy issue. I thought there was no point in talking about it, it was a done deal.

A couple of things have occurred to change that. The first is the whole thing of caller ID. Caller ID is the ability of your phone if it has a display to capture the incoming number. If I call you, you see my number. Caller ID has generated and energized the privacy debate all across the country in a way that most of us just really were unprepared for. I know that I was not prepared for it.

There is an argument you can make that caller ID is necessary for a whole bunch of value-added services to be made available by the phone company to a subscriber. There is an argument that can be made that I have the right when the phone rings at 7 o'clock at night not to answer that phone if I don't recognize the number. But there are other people who said, "You know, I run and operate a shelter for abused women. These people want to be able to call their family. They don't want their husband or abusing spouse to see the number they're calling from." So there's been a lot of debate about blocking, which is preventing that number from going forward to other people. The FCC is talking about it, Congress has got two bills in front of it, a number of states have taken this issue up as well, and it really has generated a whole bunch of privacy stuff. Let me stop here and give us a couple of definitions of privacy that may be appropriate.

First, let me say that Equifax did a poll in 1990 of the degree to which Americans are concerned about privacy. The results showed that 79% of Americans are concerned about privacy in dataflows.

Here's a wonderful quote, it happens to be from 1890, you don't often get to do something like this; let me read it. "The intensity and complexity of life attendant upon advancing civilization have rendered necessary some retreat from the world. Modern enterprise and invention have through invasions upon man's privacy subjected him (you can see this was written before we had non-sexist language) to mental pain and distress far greater than could be inflicted by mere injury." That was written by Samuel Warren and Louis Brandeis in 1890. It appeared in *The Harvard Law Review* and the name of the article was, "The Right to Privacy." This by the way is the first known citation to something called "the right to be left alone." I think it's interesting that this is the first time we see it.

The California Commission on Privacy (and I always think of that Doonesbury cartoon and Boopsie with the Esteem Commission but this is not the Esteem Commission, this is the Privacy Commission from the State of California) talked about three areas of privacy: decisional or associational privacy (that's autonomy over my own body, mind and emotions); the second kind of privacy is territorial privacy (relating to intrusions in specific locations, my expectation to be left alone in my own home); and then something called informational privacy (to shield me from unfair and unnecessary collection and dissemination of personal information).

'The people have access to public records . . . . (but) There is less control of personal data in America.'

Those kinds of privacy are certainly subject to more threats today than they were then. I think there is increasing recognition that individuals are unable to defend themselves alone. The U.S. Privacy Act makes a number of assumptions about how privacy is being protected, and it assumes that I as an individual interested in my own privacy relating to federal stuff will track the Federal Register and find out whenever a federal agency says it's going to share information with another federal agency. I have to tell you that as an informed citizen and as a bureaucrat who has access to the Federal Register, I have never done that. I have never done that. So there is a whole host of ways in which federal agencies are sharing information with each other about me that I really don't know about and don't have a whole lot to say about, and I think there's an assumption that the federal privacy law has made that it's up to the individual.

Europeans have made a completely different decision. In fact, in 1992 when the European Common Market goes into effect, they're going to have something that they call data protection. It's going to make it increasingly difficult for people to do business in America from Europe or from America to Europe if they are moving data that has personal information in it because the 12 countries that form the EEC have decided that they are going to protect the data about their citizens, and they're not going to let payroll data, subscription data, or any other kind of information cross borders. It's going to be very interesting to see how the United States responds. One of the things the European Community nations have done is that they all set up data protection boards. They have people who specialize in helping citizens deal with problems of privacy. I don't know that I would suggest the European model for us. One of the things that's a little different about European governments and the way they control personal privacy and public information is that in those countries you really have to go through a world of hurt to get access to government data and access about information about what government has done.

In America, almost every state that I'm aware of has public record laws that say the record of government is open to be inspected, it's open to the public. This is how we assure that our elected officials are doing the right thing. The press has access. The people have access to public records unless they are confidential. When you think about the way in which governments handle privacy, you make a distinction between access to public records, which we certainly have in America, and control of personal data. There is less control of personal data in America.

You may recall the situation in California where a young actress was killed by somebody who hired a private detective who looked up her motor vehicle registration, found her address, and went to her door and killed her. That's an example of using public record data in a way that I think most of us would find objectionable.

I am not sure if we're ready to pay the price of not allowing public record data to be made available. And as Kay notes from some of our debates when you come to that continuum of should a public record be made available or should it not be made available, I'm three standard deviations off the scale because I believe that government information ought be made available to virtually everyone for little or no cost.

Now, if you're not going to have privacy, if you say the government has no right to do these things, or if you're going to say that as a result of doing business with government, people have the right to know who government has signed a contract with, who they've sold land to, who they're buying pencils from, then there may be some other kinds of protections — and there are.

One of the things that's quite common is something called a Fair Information Practices Act or FIPA. Ten states have these. It pretty much characterizes what the European countries have done.

The Fair Information Practices Act is really pretty simple. It says that when you collect personally identifiable information from individuals, you will tell them that that information may become public, or it is public. I don't know if anyone's applied for a passport recently, but on the back of the passport application there is a notice that says, "If you give me this information, it is a public document, and we are collecting it because the law requires us to." So the feds are now notifying people when they collect information, that it's public record data and it's going to be used that way. Most states do not do that. But one of the things about a Fair Information Practices Act is that you tell people that you are collecting the information if it's public.

We had a situation in Florida where somebody applied for a job. He wrote on the application, "Please don't share this information. My employer doesn't know I'm looking for a job" (this was, as I recall, the superintendent of schools). The local paper went down, got all the applications, and the next thing this guy knew his local TV station was on his doorstep filming him. Now he was surprised. He was not a happy camper, but this is an example where if he had known that this was a public record he might have chosen not to do that and I felt for him but that was the law. A Fair Information Practices Act would tell people it's a public record. It would also let people know where information about them is being held. You are given the right to see that information and a right to correct it.

You have that right, by the way, with the Fair Credit Reporting Act. If you are denied credit, you have a right to go in, look at those files, and if there is an error you can force people to correct it. That was an example where the federal government really stepped in to that particular sector of the economy and said that we may not have privacy but we do have fair information protection, and we're going to allow people to know about the data, to fix the data, and if the individual will not fix it they have to carry some kind of indication that there is a problem in the data, that at least I've complained about it. For three years the committee for which I worked in Florida introduced legislation to do this. For three years the Florida House of Representatives passed the bill. For three years the Senate killed the bill and the reason was that the executive branch agencies came and said it would simply take too much money to implement the legislation.

By the way, the Wisconsin legislature just passed this year and sent to the governor a really remarkable privacy bill, a bill that would have created a data ombudsman, a data protection board, it would have provided fair information practices. The sponsor of the bill was a representative named Marlon Schneider. His staff did a superb job. I have the reports, and they will make them available to you if you want the most up-to-date study of privacy. That bill was vetoed by the governor. Evidently the basis for the veto was that the cost of implementation was considered to be too high by the executive branch agencies, which was unfortunate.

Well, privacy I think is back. I think that the impetus of the EC is very real. There is a bill in Congress right now which has been introduced by Rep. Wise of the U.S. House GovOps [Government Operations] Committee. The U.S. House GovOps Committee has a subcommittee that's called Agriculture and Information (I've always wondered how those two things got put together), but nonetheless that bill is probably not going to pass but it was clearly developed as a way to try and deal with the situation in the EC. And lest you think that this is a boogie man that's being waved in front of you, there is evidently a case where IBM is unable to move its own payroll records from Italy to Germany because the German data protection laws are significantly more stringent than the Italian or vice versa. So this is a real problem for American businesses that are doing work in Europe, and it will be very interesting to see how we respond.

That's one policy area. The reason for talking at the front end, the reason for talking about the increasing number of networks, the reason for talking about the interconnectivity, for the flattening of the organization, is to suggest that as we build these networks it becomes more and more important that we get this stuff right because it's clear to me that the speed and the velocity with which information moves is much greater so that when you think about being part of a network society it's pretty clear you don't want anybody to screw up your credit rating. If you've had the experience as I did recently of going in and trying to use your Mastercard and being denied the charge, it's awfully embarrassing. You don't really care about what the problem is but there's an example of a highly networked situation where at least I felt my privacy was violated when somebody said, "It didn't go through." That was disturbing to me.

Let me talk about another kind of issue which is access and dissemination. Let me give you some definitions of access that might help clarify what we're talking about. Access is a real difficult problem because we're generally talking about access to government records which historically have been on paper and when they're on paper we knew what they're all about. We knew that if it was a piece of paper, it was a public record. I could go to the courthouse or I could go to the secretary of state and I could say, "Let me see it." If it was a public record, I could see that public record, I could hold it.

In Florida, the definition of inspecting a public record also meant that I could make a copy, an interesting legislative interpretation. But we've been real familiar in government with meeting requests for access, and we also knew that sometimes it was a real pain, that sometimes somebody would come and they'd say, "I want 1,000 pages of this testimony" or they would say, "I want you to search the files and I want to you find the one occasion when my great, great, great grandfather bought a piece of property," or whatever. But with all the difficulties that were attendant upon the use of paper, we pretty much understood what it was. There was a history of case law, there were state constitutional statements, there was a U.S. constitutional piece on this at some point (I'm trying to remember if that's true), but at any minute at the state level certainly we knew what to do with paper records.

We're a little bit less certain about what to do with electronic records, and it's probably necessary to talk about what those records might be. First, there's data. Historically nobody really cared about data when it was on paper because who was going to do anything with it anyway? It was so complex. It was so massive. If people wanted a piece of data, that was probably all right. Now data can come on a piece of square tape or on a piece of round tape or on a diskette, and it's much easier to use and it has a different kind of value. Well, data in and of itself may not be very important but software which reads data can be.

And we now have some interesting questions we didn't have before, because before if I did a data analysis I probably wrote a report. I may have written a memo that was sent to my boss. And that memo could be made available; it was a public record.

Now I have a piece of software. That software may be usable in many other situations. In fact, there is a number in Miami, Florida, that's part of Dade County government. If you call that number, the person who answers the phone will say, "marketing." If you say, "Marketing?" They'll say, "Yes, marketing." And you'll say, "Excuse me, I thought I called Dade County," and they'll say, "Well, you reached Dade County, this is marketing." Then you say, "Well, what are you marketing?" And they say, "We're marketing software. Would you like to buy some?"

'My chairman said, 'I can imagine the colonists tipping the disk drives into Boston Harbor.''

This is a true story. This actually happened to me when I was reading *Computer World* and I looked at this number and said, "Wait a minute, what is this number?" What they are selling is a piece of software that the county wrote that deals with fleet management. It is a very sophisticated piece of software. I gotta tell you I don't have a fleet back at my house; I don't even have a fleet of miniature toys. But if you are a major city in Brazil (and this is a true story) and you have a lot of automobiles, you might want to manage your fleet maintenance, when did I service them last, change the oil, whatever.

In fact, Dade County, Florida, has sold a fleet maintenance program to I think it's Buenos Aires. They got I think $300,000 for that sale. I was saying to a number of people, "What's going on here? How can you sell this?" And they said, "Well, it's real simple. We copyrighted it and we sold it." "Excuse me, you copyrighted a public record?" They said, "Sure." I said, "Wait a minute, how can you copyright a public record?" They said, "Well you call the U.S. government or you do whatever you do and get this copyright. We hold the copyright." And I said, "I'm a public citizen and I want a copy of that public record." They said, "Sure, have it." I said, "Can I now take this public record which you have given me, this piece of software, and can I resell it?" They said, "No, because if you do you're violating our copyright and we'll take you to court."

That's an example of the situation where government in doing its normal course of business has written a piece of software (in the old days we would have said "written a set of instructions for a clerk," but today it's a piece of software), they copyrighted that, they're still abiding by the public records law. If you go there as a citizen, they will give you a copy of that software. Mind you, they will not give you the documentation unless you ask, they will not give you an update to the program, they won't give you any program fixes, but they will certainly give you a copy of the software. If you are a customer of Dade County and you buy the software, they will give you the documentation, they will give you any fixes they make to this. Guess what, they will also come and train you and they'll engage in a number of other activities.

Well, access to software is a problem, but then there's another issue. I'm a citizen. I want to find out how my government is operating. We had a situation in Florida where a property appraiser downstate in Broward County sent a tax bill to Federated Department Stores. When the manager of that store got the tax bill he thought, "Gosh, this is obviously a mistake. This can't be the right tax bill. This is not my tax bill" and called the property appraiser up and said, "There's been a mistake, this is not my tax bill," and the property appraiser said, "Well, excuse me, it's the right number, that's your tax bill, the computer did it so it's got to be right." That was not good enough. The department store hired a lawyer, and they said, "We want to see the computer program." And the property appraiser said, "I can't give you the program, it's trademarked, it's copyrighted, a private sector firm has made this available to us. We'll give you the formula we use to calculate the tax bill." And the lawyer said, "Well, I'm sorry, that's not what I want. I don't want the formula. I want to see the actual computer program that calculated my tax bill." Finally that wound up before the committee for which I worked at which point my chairman upon hearing the story said, "You know, I can imagine the colonists tipping the disk drives into Boston Harbor saying, 'No taxation without documentation.'" This gets to be pretty critical stuff.

Beyond access to the software to the data is a more profound issue which really comes down to access to the whole package, and by that I mean how can I as a citizen really understand what's going on without access to the actual computer, to the computer time, and to the experts.

What I'm really trying to get to is this concept that all of this technology that's used by government really is adding value. It's changing the nature of the way government does business. Is it really equitable for me as a single individual to try to understand or be able to understand what my government's done when my government has got 35 software programmers and a very large machine and thousands of pieces of data, and when a decision made by government is really predicated upon that knowledge?

I offer to you a situation that you may or may not be in with reapportionment redistricting. It's pretty clear that with Arc Info and other kinds of GIS's that people who are drawing boundaries and making maps governing the way we vote really have an incredibly powerful tool. If, for example, I wanted in my home state to say, "Okay, short guys going bald with glasses want to draw their own districts." well, I'm going to have a tough time because I really don't have the kind of capacity to deal with this one on one, and I suggest that access to the information really is going to take on some interesting issues in terms of what is equitable access. Is it enough for me simply to get the data hard copy? I don't think so. Is it enough for me to get the software? Well, maybe so but where do I run it? Where do I get the documentation? Where do I get the training? So there's access to information in a very large sense, and I'm not sure that any of us have really figured out how to do this. Well, those are some negatives.

Let me give you some positives where access is being done in a very different way and in a very intriguing way. Santa Monica, Calif. If you live in Santa Monica and you have a PC and modem, you can dial into city government and you can do wonderful things. For example, you can read staff memoranda prepared for the city commissioners before the commission meeting. You can actually see those documents. You can send electronic mail to any bureaucrat in the city, and they have a fascinating rule that if you get it electronically you have 24 hours to respond but if you get it in paper you have a week. Fascinating!! One of the real concerns they had when they did this was, "Aren't they going to get more negative mail? Aren't people going to sit there in that damn pothole or 'you didn't pick up my garbage?'"

Here's the real interesting thing that happened. The number of negative comments about city services has remained exactly the same. The number of positive comments has gone off the map. Evidently, it's a lot easier to write a thank you note and be appreciative when it takes less time to do it electronically. It's interesting. They don't charge for this service, by the way. As long as you are a resident of the city of Santa Monica, you can do this.

One of the things I'm particularly appreciative of — we were talking about conferencing. They are running community debates. They are allowing people to talk to each other on these computer conferences about issues relating to city government. One of them is homelessness — the issue of homeless people. They have put four public access terminals in the library. Who goes to a library? Homeless people. Who's participated in this debate? Homeless people. So you have a debate about homelessness where the homeless people are actually participating. I really like that. I think that's very interesting. It shows a more positive way to use the technology.

Montgomery County, Pa., was the first electronic courthouse. They say that they have been able to put off building a new courthouse and in so doing have saved $8 million or $9 million because all the foot traffic stays away, because you can dial in and find out who your public defender is, when your trial is scheduled, all the property records, and also do a number of things you have to do with county government electronically. An interesting piece. Hawaii has just built a digital microwave network that allows people to testify before various legislative committees. I know in Alaska that you can engage in testimony before a committee from a long distance because I did it from Florida and was able to speak in front of Rep. Brown and Rep. Boucher. So I guess the point of these counter-examples about access is that access can also be provided in a very positive way and change the nature of the way we are communicating with our governments and, of course, they can communicate back. So I think there are some positive sides to access as well.

I think that dissemination is a little bit different. Access and dissemination are very often lumped together. Access generally is a mandated and statutory right. I have the right to see something. It's a little bit different with dissemination because we get into some real private sector issues. Does government have a right or necessity, not simply to make something available if you ask me for it, but does government have a right or responsibility to broadcast it, to publish it, to make it widely available?

My answer to that tends to be yes. I tend to fall on that side that says that government should be able to disseminate as well. That's running into some very real, or has run into some real problems, particularly under the Reagan administration's proposed rules under OMBA 130. The librarians may know about this, the others of you may not. But there was a proposed rule from the Office of Management and Budget that would have prevented the government from disseminating information with a value-added component. That means you could only get raw data, no indexes, and no interpretation. There was pretty much a storm of controversy over that proposed rule. As a result of that I think the Reagan administration pulled back that rule, nothing has occurred with it, and we are now waiting for Congress to pass the Paperwork Reduction Reauthorization Act.

The Paperwork Reduction Reauthorization Act did not pass the last session of Congress. I'm not sure what they're going to do with it. At this point it's in limbo. OMB has said they're not going to put out any federal policy relating to information dissemination until that bill is passed. The Council of State Governments, the National Council of State Legislatures, and the National Governor's Association are involved in trying to have some impact on that. Because, in fact, decisions the feds make about these issues have a major impact on us as well. I think that we're going to see a much more positive take on the world, at least on dissemination, when we get that bill passed, and I think that OMB is going to be much more moderate than it has been at least four years ago.

Let me move from access and dissemination to security. At one point Kay was talking about the necessity for us to do things well. I used to call this security, and maybe what I'm talking about is the ability of state government to do what it says it's going to do — to build systems. I don't know how many people in this room are in information systems development. I can tell you that I talked about information systems and these applications as if it was a done deal. I think that almost everybody in the room should know this is a non-trivial problem. I learned from going to MIT and listening to some of their people that when something is really, really hard and you really don't know how to do it you call it non-trivial. So building information systems is non-trivial. We don't know how to do that very well, and one of the things we also don't know how to do very well is to secure our systems.

'We still have the dictaphone belts. We have no working dictaphones. You can't run these guys through your fingers.'

The security of information systems is critical. You can't have privacy unless you can secure them. There is a tremendous risk of the loss of data. Computer fraud is a major problem. I do not worry about hackers. I must tell you that when you do an analysis of the threats to your organization, hackers come down just about last, 9th or 10th. Water turns out to be the #1 problem, and running toilets on the floor above you are probably the most difficult problem. That's why all good data centers have lots of Vizquine. If you wonder what that's for, it's so you can throw it over the box when the toilet starts to drip through the ceiling. I wish that wasn't true. The real problem, of course, is your own employees. If you're going to talk about security threats, the real concern more often than not is a disgruntled employee is either stealing from you or making your life miserable. There is a problem with viruses and that's if anybody in your organization is bringing in software from somewhere else. That really is a potential problem.

We talked at lunch about the question of pirated software or bootleg software or software we haven't paid for. I'm not sure how many of you are lawyers but *BV Engineering vs. the State of California* is an interesting case. BV Engineering is a little boutique software house. It makes *really* whizz-bang software that eight or nine people would use. Well, it turned out that the University of California made 700 copies. They paid for one, they made 700. BV Engineering took a dim view of this and decided that it would sue the University of California. The University of California said, "Au contraire, we have immunity; have a nice day." And that's true, and they've been unable to sue because it's the State of California. Well, in Florida what we did was put out a lot of notices to all of our employees saying "It is illegal, it is wrong, do not do this." If you have 20 copies in the vault, we'd better only find 20 PCs running the software.

I point this out as a security issue because as the accountants put it this is a contingent liability. If you are stealing somebody's software and you have it in your PCs, be prepared to be audited because Microsoft and some other people are coming into corporations, looking at what's on the hard drive and saying one, two, three, and taking you to court. Security therefore in my mind may be better talked about in terms of having a well-managed, well-run, well-operated information technology activity. Maybe it's not really security. Maybe it really is the ability to do what we say we're going to do. I do think that security is a major problem, and it's particularly true with privacy, that obviously these two things are very much related.

Let me talk for a minute about archival issues. One of the things that really is dismaying to me is the loss of public records. We all know what to do with paper. What do you do with a piece of paper? You file it. Actually you don't file it one time. More often than not you make six or seven Xerox copies and then those people to whom you send it file it. If you're a records manager you know that there are hundreds of cubic feet of file cabinets that have duplicate pieces of paper in them. That has some problems. There are some real difficulties associated with that.

We had the presentation from the University of Alaska regarding 6,000 reels of tape and the difficulty in saving them, the difficulty of having to condition the environment in which to save them. The fact that if you don't use that tape it tends to crumble, and we don't know how long computer tape will last. There have been some attempts by the National Institute of Standards and Technology to artificially age computer tape. We think it will last 30 years. In Florida we used to record cabinet meetings on dictaphones. At least some of the people in this audience are old enough to remember what a dictaphone looks like. We still have the dictaphone belts. We have no working dictaphones. You can't run these guys through your fingers. Trust me.

The archival issues relating to information technology are very real. We really don't understand how we're going to save this, and we really have not stepped up to a couple of issues. One, we are not really prepared, or haven't thought through, how are we going to continually upgrade the mechanical thing that reads that medium. The dictaphone belt is an example. I am told and I think this is true from talking to somebody at the National Archives that the 1960 census was recorded on paper tape. At one point there were two machines that could have read those tapes. One of them was in Japan, the other is in the Smithsonian. I'm told that's a true story. They have since converted those tapes into some other medium.

Are we prepared, however? As you think about your organization, how many large floppies did you convert to small floppies? Every time you upgraded your word processing program or changed your word processing program, did you upgrade that? Most of us don't do that. The other thing we do, particularly in government, because it's expensive, is we write over these guys so you very rarely can find a draft. If you're thinking now about

Abraham Lincoln and the Gettysburg Address on a piece of paper. I'm not sure that you'll find those kinds of drafts. This may or may not have meaning for you, but I think it *will* have meaning for your children or your children's children.

There are some very interesting questions here about what is an electronic record, how will we decide to archive it? The issue may in fact not be that we can save everything because, again, we can probably save everything. The question is can we index it, and can we find it and can it be usable? Those are very different issues. So the archival problem is a very real problem. All too often we design systems without letting people concerned about access or participation be involved, and we certainly don't generally ask an archivist to participate when we design a system. That's an afterthought. After the system has been built and it's been chugging along, somebody comes to the archivist with a bunch of disk drives and says, "Here." The archivist says, "Excuse me, what would you like me to do with these?" And the person says, "Well, you're the archivist, you need to save them." The archivist says, "Whoa, time out, where's the documentation, what was the purpose, when was it built?" It just can't be done.

So unless we start building in the archivist at the front end, it's not going to be possible to make meaningful sense out of this in the future. I would suggest to you that unless we build-in the design of access and dissemination to these information systems, we won't be able to do a very good job of that either. So the bottom line for this part of the conversation is that you've got to involve the user community in a very broad sense as you design your information systems where, as I've said before, data processing is too important to leave to data processors.

That takes me down to a set of questions dealing with how would democracy work, do we need a new bill of rights? Larry Tribe, a Harvard professor, has suggested that we have a 27th amendment that he says would protect us in the information age. The U.S. National Commission on Libraries and Information Science has approved unanimously a major federal policy document called "Principles of Public Information." They characterize this as a bill of rights for the information age. This is very interesting stuff. Some people are beginning to ask the question, "How can we protect democracy in the electronic age?" Let me read just a couple of these things very quickly. This is a proposed bill of rights for the information age. "Right #1: The public has the right of access to public information. Right #2: The federal government should guarantee the integrity and preservation of public information regardless of its format (doesn't matter if it's paper, doesn't matter if it's on a hard drive, or whatever). Right #3: The federal government should guarantee the dissemination, reproduction, and redistribution of public information (make it available). Right #4: The federal government should not allow cost to obstruct the people's access to public information (an interesting idea that even though this stuff may cost more, somebody has to pay for it and make it available for people to read). Right #5: The federal government should guarantee the people's access to public information regardless of where they live and work (so should this be Washington, D.C., you should be able to get this stuff almost anywhere)." In conclusion they write, "We urge all branches of the federal government, state and local governments, and the private sector to utilize these principles in the development of information policies and in the creation, use and dissemination of public information. We believe that in so acting they will serve the best interest of the nation and the people in the information age."

I'm not sure if we need this. One of the significant policy debates going on in Washington right now appears to be whether or not we should amend the Freedom of Information Act and whether or not we need to have a bill of rights. My own particular sense of this is that we don't. My own feeling is that the issues that we are dealing with here are issues that we've dealt with before, that these are issues that most of us are very comfortable in dealing with, particularly legislators. That in fact the issues are those of power, authority, who gets what when, where and how, and that the fact that it's electronic should not make a difference, that we should treat these kinds of issues the way we normally treat all kinds of public policies. So I am personally not of the opinion that we need to do that. I am, however, of the opinion that we need to think about how we will adjust, adopt and adapt to the technology.

Thank you very much for your patience.

JOHN McKAY: Let's take time for a few questions.

HERBERT DORDICK: I have a couple of comments. I sometimes think that while our job is necessary to protect democracy we also have a job to make for more democracy, open up critical discourse to allow people to participate more readily, and I think there are some opportunities to do so except I would be dead set against electronic voting. An uninformed populace voting is very dangerous. Unfortunately, we do have an uninformed populace. One of the points that Thomas Jefferson made many years ago is that an informed society is what democracy needs. Unfortunately, for all the media we have that are available to us as Larry showed in some of his information, people are not informed. Perhaps they don't choose to be informed. Perhaps life is too difficult to be informed. I don't know. The other point I'd like to make which I think really is a conundrum, I thought you were talking a lot about not so much how government can change the way it does business but what business the government does, you see.

Now, one of the virtues of private industry and I think at the end of this recession you will see them claim a high level of white collar productivity. They've gotten rid of the white collar workers. You see, that's how they're going to claim it, and they're going to have fewer people. Perhaps by then they'll learn how to use computers and learn how to use information because I think the focus has to be not on the technology but on the information productivity you have, not the transaction productivity the computer gives you. So I think that we're living in a society where government unfortunately becomes the employer of last resort in many cities, certainly in the city where I come from, and in New York, and in many a large city and state government. So here the opportunities exist for improving productivity, which would mean laying off people perhaps, but the pressures of our economic structure and the mess that we're in because we haven't trained people, with the whole cadre of minorities from the ages of about 18-40 out of it, and now government is forced to be their employer of last resort. So, this is not a question. There is no way to resolve it. But it just shows that despite all the wonderful technology we have, the realities of the economic structure, the realities of mistakes we've made for the last 100 years, the fact that we didn't have the will to invest money for retraining 20 years ago are causing us to see the opportunities that information and information technology can do for us just go by the wayside. And this is a very serious problem. I am not quite sure how we're going to deal with it. It's going to take another 40 years, perhaps.

LEVINE: Let me only comment by saying that I come of a state that's under severe economic pressure. I'm not going to use the word "downsize." We're laying people off. In Florida I understand that their revenue last year was a billion dollars down. They're looking at a significant reduction in people and clearly that's happening here. So I think the government just like the private sector, whether it's mismanaged or not, is under incredible pressure to become more productive. One of the comments I was trying to make is as people do come in contact with organizations or are members of organizations that use technology to do these things, then they're going to come to government either as elected officials or they're going to come or they'll be brought into government as you were, and they're going to bring to bear on government a whole new set of expectations and competencies and capabilities. I'm not talking about government as the employer of last resort. I'm saying that people who are going to run for office and be elected and manage our civil service are going to be people who more and more are conversant and competent and capable and have the same kinds of expectations for government that they had from an effective performing organization. If that starts to happen I think you will see government, in fact, become more productive. We are in a competitive environment, too.

DAVIS FOULGER: This is a countercomment. We've heard a lot about productivity, the decline of knowledge workers and one thing or another, and I think there's a lot of misconception going on. The fact is that there hasn't been a turn in the information age yet where information workers haven't expanded and, claims to the contrary, Japan doesn't have a smaller information knowledge worker base than we do, *every* worker in Japan is a knowledge worker. If you are on a manufacturing line you're a knowledge worker because you're expected to look at your product, your output, as a factor which you can improve the quality of, that you can improve the productivity of, and every factory worker works in a group that tries to figure out how to make their part of the factory work better. They're *all* knowledge workers. If you differentiate our society from theirs, one of the differences is that we don't do that as much, that we treat our factory workers as if they were absolutely interchangeable cogs in a wheel that don't think.

LEVINE: I think that there are some counter-examples, for example, Wal-Mart. Wal-Mart is being talked about as kind of that prototypical new organization because they have "empowered," the same word that you used and somebody else used, it's a word that's making me crazy because I'm not sure if I understand what it means, but they have empowered their managers of these sections to raise and lower prices, to have sales. A lot of what's being talked about in using the new technology is using the technology to give people more ability to impact. So on the one hand I think that we're seeing in America a greater attempt to use the knowledge of individuals to provide feedback, to provide information, and to improve the product. The other thing I'd say about the decreasing numbers of people, at least in the organizations *I* work in, there are fewer knowledge workers if you call those people account clerks. Lotus 1-2-3 has made it possible to reduce a lot of the people who used to do that kind of work. I'm not saying we have fewer people, because there are a lot of programmers we had to hire to help people like me to use Lotus 1-2-3. But I see the day coming when in fact those kinds of knowledge workers, information workers, people who I used to call up and say, "How much money is this organization spending on object code 00203 - book and magazines?" Now I just query the database. So I think we are seeing a change in what people do. There has not yet been a net change in the numbers that vote. The OTA study of the office in the year 2000 is suggestive of the same thing that Drucker has talked about. Fewer layers of hierarchy. Fewer levels of knowledge workers. I see that happening.

FOULGER: But saying fewer levels is not the same as saying fewer numbers.

LEVINE: I'd agree.

Four Perspectives:

The Past, Present and Future of Telecommunication

MARK FOSTER: This morning I'd like to offer some observations based on my experience in the Western Conference of regulatory utilities commissioners, which includes roughly a dozen western states, and look at the gap between urban and rural development of telecommunications. Then after that offer some observations on, I think, what it means here in Alaska. What lessons we have learned up here versus outside.

For some historic context, at least real briefly, I think what we've seen in Alaska, and particularly from the utilities commission point of view, is that, in the '70s basically we had a transition from having no telecommunications available to having telecommunications available over the course of that decade in rural Alaska. In urban Alaska we had a transition from party lines to private lines. Contrast that with the other western states and by and large we are paralleling them in that transition.

In the '80s we saw in Alaska a transition to digital switching occurring. We see definitely a transition from party lines to private lines throughout the state, including rural areas. And we see some of the new technologies like VSAT coming into play enabling a lot of transmission to remote sites that otherwise was not available. And, during the '80s when I contrast that to the experience in other western states, we find that in a sense we have caught up with them, in a large measure, and in many cases surpassed them in terms of the deployment of digital switching. For a state our size, we really have come a long way very fast.

From the utilities commission point of view, we look here on the '90s and one of the things I think we are very concerned with is to make sure that that progress is maintained, and that universal service, as we see it, that we take a look at that and expand the definition. The traditional definition has been kind of plain old telephone service. Do I have dial tone? Can I make a call? Is the operator answer time reasonable? Some of those traditional quality of service standards associated with basic telephone service.

As we look ahead into the '90s, I think one of the things we need to focus on is what new technologies are bringing to the state and how do we make sure that those become disseminated throughout, so that they're shared between urban and rural.

The commission has established some policies to try and get at that, geographic averaged rates being one, so that you pay the same rate for the same distance call regardless of where it is in the state. So that's one of the big policies in terms of telecommunications that the commission has concentrated on. And, it's interesting that that policy of universal basic service being available, and being an important element, the commission has basically articulated that throughout the '70s and '80s and its existence into the '90s, and that became statute effectively in 1990, the same year that the legislature, in effect, certificated GCI. So it's interesting that all of these forces are kind of converging here at a point in time.

One of the challenges from a regulator's point of view that we face here into the '90s is balancing universal service against the competitive market. And recognizing that there are win-win situations out there, and I think that we are trying to implement that right now. I guess I look forward to seeing the market develop and seeing what kind of innovations are brought to the market and how they are spread around.

One thing I will offer up is I think the commission as a whole is interested in looking for exchanges and bargains with utilities in terms of what can we do to help the utilities provide some more service in terms of some of the newer technologies, voice mail, some of the higher bells and whistles that we see available and higher quality service. And in exchange there might be some regulatory flexibility. We're looking, basically, to the utilities to say what works

in Rural Alaska

best for them.

With that I will encourage the other members of the panel to react to that if they have anything to offer. And I look forward to your questions. Thank you.

McKAY: Thank you, Jim.

JIM GORE: In the world of technology that we have today, I'm concerned about the fact that we have so much technology that we probably outpace what the average consumer knows about or has figured out how to use. As a communicator looking at the marketplace, it's interesting to me to see that we have a lot of solutions, and these solutions are looking for problems. We have heard this week about education and how we need to educate users and the consumer to the point where they can determine if some of these technologies are useful to them or of some benefit. This is really the point, or the focus, that I would like to stay on this morning. Is there a lack of technology? I would say no. Is there a lack of interest from the average citizen? Yes. Some people believe that technology is the most important driving force in helping people to become one, or bring their community of interests together. If this is one of your beliefs I hope to cause you to stop and think, because this belief will skew our understanding of markets and the role of technology in the marketplace.

If you look at history, is the driving force technology, or is the driving force the consumers and the pressures that they can bring upon local and state regulators and politicians? I ask that as a question for you to consider.

One of the things that was frustrating for me when I was trying to put together remarks for this introductory was the fact I'm always solving problems. With no problem to solve here, it forced me to focus on the issue of technology. We have products and we have solutions today. But the marketplace does not react and they're not willing to pay

Session moderator John McKay

Mark Foster

was appointed to the Alaska Public Utilities Commission in 1990. He is chair of the telecommunications committee of the Western Conference of Public Utility Commissioners and has been vice-president and secretary treasurer of the Western Conference.

James S. Gore

is vice president, administration of Alascom. His introduction to telecommunications in Alaska was as a technicial for the Federal Electric Corp. White Alice radio sites in 1959. In 1969 he joined RCA Service Company, which later became Alascom, as a site supervisor.

Richard Dowling

is senior vice president, corporate development of General Communication Inc. Before joining GCI in 1981, he was principal advisor to the Hammond administration on telecommunication policy. As chief engineer for the governor's Office of Telecommunications, he was involved in the state's satellite projects in the 1970s.

Willie Hensley

is president of the NANA Development Corp. and a director of the NANA Regional Corp. He is a former president of the Alaska Federation of Natives, a former University of Alaska regent and a past chairman of the Alaska State Democratic Party. He was a state legislator for 10 years.

Larry Wiget, left, of the Anchorage School District, and another participant listen to a speaker.

for those products. Perhaps the cost is too high, or again, they don't know how to use them.

There's too much emphasis on technology from my point of view and not enough on application. This is where education can come in. Technology is advancing so rapidly that we can't find applications fast enough. Many companies, or groups, have made commitments to technology but can't find the business case for deploying the technology.

The cost. If you were to take an engineer and give him a project, the engineer is interested in designing the most advanced technical system that an engineer can put together. But when you bring alongside the economics of that you find out that you can not afford it. So are we at an impasse or are we at an overload point?

We're going through a transition to competition in Alaska. This has created a sense of urgency to develop new products and technologies to compete with in the open marketplace. My view is the market does not seem all that eager or ready for many of these products. And so, it's a dilemma that we face.

I believe that the combination of economic and political, social and cultural forces actually have played a far greater role in driving the telecommunications industry than technology could have possibly have done on its own. I think the key to finding what is useful to the average consumer is to determine what that consumer needs. We need to understand the social, the political, economic and cultural forces that affect their lives and society.

We have wonderful technology, we have amazing applications, we just don't have the necessary markets. And in Alaska, we geographically are far flung. In the 1990 census, I believe, 550,000 is our population. So we don't have all that many people to use this technology. Are we doing a good job of educating the consumers on how to use technology to their best advantage? The consumers that I encounter many times do not know how to use it, they don't know if it will increase their productivity, they don't know if it will reduce their costs. We need to provide solutions to consumer needs and to business problems.

Technology is neutral; it's neither good nor bad. It's how you use it. The trend today with our economic situation (we heard the good and bad from the Center for Information Technology regarding their funding) is that we have to do more with less and technology can help you do that. Hopefully there will be some economies of scale.

I would like to just say something about education; although that's not my real focus. I believe that a vision for education should go something like this: We should allow each child to achieve whatever he or she is capable of. And recognizing this underlying vision is the desire to let each child be a contributor to a global, competitive, economic system, to become an intelligent citizen, a moral and ethical person. I believe we are headed toward a global economy and a global government.

One thing that is of particular concern to me as I look at technology is: How do we develop a world class technical work force that can maintain all of this technology? I look at the people within our own organization and many of us, you know, have been around for awhile. I don't see a new crop of technicians or technical people who could maintain this technology that we have grown used to. This is another item for the academia community to consider.

I believe business has to become more involved in education. Some folks would even say that businesses have to plan for their own education programs because we can not depend upon the educational system that is in existence today; because we require people who are in the science category. If you've just heard what's been on the news lately about some of the high school tests, they can not do the math, they can not do the various things that are necessary to be in a scientific type, high tech global community.

So are we at risk here as a nation, as a state, as a community? Some people would say yes. Actually I would like to take the positive approach and say that if we put our minds to it and we make a commitment we can take Alaska and perhaps show the rest of the world how to do it. I have been involved with nations who have come to Alaska and looked at our model of communications, the infrastructure that is in place today. We told them the good, the bad, what our experiences were and they have gone off and designed a similar network for their country, China and Australia, to mention a few. They look at Alaska as being on the cutting edge of technology when it comes to telecommunications.

Less on the serious side and more on the humor. Do you know the difference between business and academia? The most important difference between business and academia is this, in business everything is dog eat dog. In academia it's just the reverse. Thank you.

McKAY: Thank you, Jim Gore. Richard Dowling.

RICHARD DOWLING: I'm glad to be here this morning to talk about one of the subjects that is one of my favorites and that's rural telecommunications. My career in Alaska for the last 20 years has been intertwined with this subject, and it's one that I have always gravitated to and found the most interesting and exciting.

Rather than talk about the history though, that we've seen, I thought today maybe an assessment of the near term future and maybe a little bit of the present would be a little more stimulating. Now today, since my company is in the long-distance business, I'm going to talk more about that aspect of the business. I note that currently, as Commissioner Foster says, there are exchanges in virtually every community in the state. Many of them are fairly modern digital types. What I'd like to talk about is what connects those to the rest of the world.

First, and I will tell you about technology today, and I'll apologize in advance if I use too many buzzwords, but I'd like for you to get a feeling for the system that my company has in mind, and has planned for. My remarks are really based on that plan which is on file with the APUC to serve statewide over the next five years.

But first it may be helpful to break down the definition of rural into some more manageable pieces. I see those needs breaking down along the lines of communications density. They would be roughly these: If you look at nonurban regional centers such as Ketchikan, Kodiak and Kotzebue, those would be examples; these locations would have say between 1,000 and 10,000 telephones connected to their exchanges. And they would need somewhere between say about 20 and maybe 200 long-distance circuits.

Next on the list would be medium sized bush communities; McGrath and King Salmon come to mind. They would have between 250 and 1,000 phones connected to their telephone exchange. They need between 10 and 30 long-distance circuits.

Going on down in size, bush villages like Grayling, Anaktuvak Pass, St. Mary's and Unalakleet have between 50 and 300 subscribers — note there's some overlaps here — perhaps four to 15 long-distance lines.

Small villages like Ivanof Bay, Sleetmute and Noorvik would have fewer than 100 phones; some would have only one. They have limited long-distance needs, perhaps fewer than five long-distance circuits.

And then at the very bottom end of the communications density scale you have small isolated commercial establishments, like mines or individuals like Susan Butcher, and these locations need only long-distance access. And usually a single circuit suffices their needs.

There's a lot of overlap in these, versus community needs versus size. Based on the economic base and prosperity of the community, its community of interests in business terms, its requirement for the private line services. But these are general categories that let us discuss technologies to provide service at affordable costs. Clearly some communities that fall into these categories will be served by terrestrial means via cable or microwave. But today it's the large number, the numerical majority for which satellite communication will remain the only viable method of providing service that I'd like to talk about.

The three groups that I talked about, those that have long-distance channel requirements in the somewhat below ten but maybe over a hundred, will use surprisingly similar technologies but with certain important differences. And again I'm talking about the plan that we have on file with the APUC.

The first characteristic is that they operate at C-Band. That's the original set of satellite frequencies that was assigned and developed over time, has historically been used in Alaska and many places in the lower 48. Now that's distinguished from the relatively new Ku-Band technology which allows the little VSAT antennas that you see on top of buildings. C-Band is less expensive in terms of a satellite resource and has, in general, a much broader coverage.

The second characteristic they all employ, modern solid state, they have highly integrated transmitters and receivers. This improves reliability and cost as well.

The third characteristic, and a very important one, is that they use a new type of "switch in the sky" technology. Instead of having long-distance switches located discretely in Anchorage, Fairbanks or wherever, the satellite itself actually becomes a part of the switching network. The jargon for that is called "Demand Assignment." That voice equipment makes available quality which has been hitherto unavailable and economy with satellite usage. Quality because, in addition to using digital transmission, which is the mode of preference today, it enables single hop calling for many bush locations and just about any other. Economy because they use about a third of the satellite space, a very expensive resource. GCI has been working with Hughes Network Systems for about five years to develop this key piece of technology. This technology is now being developed or deployed worldwide, from Taiwan to the Soviet Union.

Fourth, they will all be designed to go for long periods between maintenance visits. And, in addition to using high reliability components you put in a lot of monitoring and the ability to remotely control from a central maintenance facility that's constantly, by way of computer, addressing and assessing the health of the network in the entire system. You try to anticipate problems rather than respond to them.

There are differences in the facilities that cover this range of requirements and they differ in important ways. The largest group, those serving between 200 and down to 20 long-distance circuits, use relatively large antennas. They are characterized by antennas of seven to nine meters and larger equipment shelters to support the larger equipment, or channel requirements. They also have, for each critical component, that is a component that can affect more than one channel, two of each so that they can be instantly switched in either locally or remotely on failure. And they have a generator to back up commercial power in case there are long outages. These stations are typified by the stations that we currently operate; we operate seven of these from Unalaska to Prudhoe Bay.

The next smaller group is those serving between four and fifteen circuits. They use antennas down to three meters now. Some would have a slightly larger antenna. They also have smaller shelters that are modular in architectural design and designed specifically so they can be transported in small aircraft. They don't have the duplicate components, but they're designed for fewer than one outage in every two years. But while they don't have generators, they have eight hours of battery plant to continue operation in case of a commercial outage. They also have the extensive monitoring and remote control and health checking that their larger brethren do. This is a type of station that we successfully demonstrated at King Salmon and here in Anchorage in July of last year.

The last group, and one that generates from a technologist point of view and perhaps from a service point of view, some of the greatest excitement, is those serving only a few telephones and providing access to the telephone network only, the toll network. The individuals or small commercial establishments or very small bush exchanges. These use a new breed of satellite to be launched in about two and a half years. It's a very, very large satellite and the generic name is Mobile Sat. It uses a different band of frequencies and will communicate with an earth station roughly the size and complexity of a vehicle mounted cellular telephone, having an antenna smaller than a UHF TV antenna and costing less than $2,500. These units, the telephones, are highly portable, make available normal telephone service. You have a normal number that can be called; you can makes calls out in the normal way equivalent to that of urban residences, virtually anywhere in the state. The cost will be somewhat higher than you would experience in the urban areas, will be clearly in the affordable range.

That's been a quick tour of my plans, or our company's plans, for rural telecommunications in the long-distance sector. I hope I have not given you so many facts and figures that I've obscured the fact that this is a planned system of modern facilities, technologies. You have to draw a line in the sand and say at some point these are the technologies we're going to use . . . that provide high quality and competitive service for long-distance needs of rural Alaska. I hope I did not obscure the fact that that's a systemic approach. I'm really excited about the prospects that new technologies can bring. I agree with Jim in one respect that you have to define how you're going to use them and they have to make sense. But the availability of the new technologies will drive new applications and make existing applications more widely available. And I'm very excited about the possibility of having telephone service available anywhere in the state that anyone wants to have access to the network. Thanks.

McKAY: That was Richard Dowling. Willie Hensley.

WILLIE HENSLEY: Thank you for the invitation to be here. I'm not a technician but I have observed the changes that have taken place in rural Alaska over the years. The changes in urban Alaska have been rapid, but the changes in rural Alaska perhaps have been more complex and more rapid.

I come from that generation of rural Alaskan people that have seen the changes from virtually the sod house and dog team days to now. And the smallest distances were difficult distances in terms of communications. I can recall living 15 miles or so from Kotzebue, which to me seemed like a hundred miles, and quite often, even that short distance we wouldn't bridge that distance physically but just a few times a year. And our nearest neighbors were maybe a couple of miles away. But those that were just across the sound were almost within sight, and I could see how the Indians developed this little smoke signal system that they used to have. Because the desire to communicate is part of human nature. I remember the Satterlees used to live across at Pipe Spit and we lived across at Little Noatak. And in the summer we would just occasionally build a fire, we would fight the mosquitoes or whatever or smoke fish and we'd generate a little plume of smoke. Well, the next thing we'd know we'd see a little plume of smoke across the bay there, so we'd make another big plume of smoke — but we did not have any system.

The idea of communications, modern communications like we have today was, of course, not even a figment of our imagination. Although, we did have a — well, I don't know if you could call him a shaman or not — but a man who lived in the interior of our region, in the Upper Kobuk, named Maniilaq who in fact prophesied the idea of communications through the air. That was just one of the things that he discussed as something that has come to pass among other things.

Not only were telephones virtually nonexistent, even radio was not readily available. If you had a radio antenna that was high enough, you could sometimes get a station, depending on the weather. But we had better communications by short wave from foreign countries than we did in English. I mean, we heard all kinds of strange languages coming across our short-wave radios that none of us understood of course, and that gave us lots of time to think about what they were saying and doing over there. But we did have in Kotzebue access to the ACS (Alaska Communication System) where people would go to communicate by radio. And even as late as 1966 when I made my first race for the legislature I had to take my bike and bike up to the ACS station to see whether or not I was, in fact, winning that election. And I did.

'As late as the mid-'60s most of our communities didn't have the basic essentials of what the communication system needed.'

But the interesting thing though was that even as late as the mid '60s most of our communities didn't have the basic essentials of what the communications system needed to grow on, and that was electrical power. And we were much like rural America 30 years before that particular time. So as I was traveling through the villages in the '60s it dawned on me that people had some interest in electrical power. Because at that time they were still using kerosene lamps, you know Coleman lamps, candles. And if there was power in the village it was maybe a village store or two stores that had a light bulb. I mean you couldn't use more than a light bulb; if you used a toaster everybody else would run out of power.

So it was a limited system and so I became active in trying to produce electricity in the villages through what became known as Alaska Village Electric Cooperative, I was the first president. With the basis of electricity we had the potential of other changes that have come about. Electricity, even then, was one of the first instances in which a villager would be required to pay a bill on a monthly basis to somebody else, somewhere several hundred miles away. Now that was unusual. Now people were used to going down to the village store and paying for something if they had the money. But coming up with a bill, every month, for a service was a new experience because most people owned their own little houses, their own little shacks, they didn't have mortgages, they did not understand mortgages. So having to pay a regular payment was an unusual proposition.

That was one of the big concerns that we had as we tried to figure out how to make the electrical system function, and, on a statewide basis. And even $20 a month in the '60s was a lot of money. And the REA was very reluctant to come up with the $5 million it took to produce the electricity because they were concerned that they might fail, that is a loan would go bad, because they have had such a good record in rural America. But they did provide the money and that was the basis of the electrical system that sustains our communications system today. That was absolutely essential, it was the basis of many changes that came about, in housing ... I mean, generally speaking the government went to communities that got electricity. If there was a water and sewer program it went to those communities that had the power, that was very important to producing the electricity that was needed for the system.

And so when you talk about rural telephone policy you are really talking about just one element of changes that have been taking place in rural Alaska. But a vital one. I mean, it was an important link. Heretofore, we think we have problems now in terms of communications and understanding between rural Alaska and urban Alaska; but if we had not had the development of a communications system that has enabled us to communicate, we would be in really deep difficulty. That chasm of ignorance would have been a lot, a lot greater today had we not developed a system of communications. And of course the radio system was a key element of that. I was involved with the creation of the Alaska Education Broadcasting Commission. At that time we did go to other countries. I remember, George Holman and myself went to Canada just to look at their radio communications system to the Arctic. We admired that not knowing that in a few short years we would transcend what they had in terms of technology.

So as I see it we have had a great series of misunderstandings, a great deal of ignorance, divided by language, and values, lifestyle and distance between village Alaska and urban Alaska. And I feel that the communications industry has helped to bridge that gap over recent years. And to me telecommunications has helped to bring about a greater sense of statewide unity. There are differences and will continue to be but not the kind of chasm of ignorance that noncommunication helped sustain in the past.

And to me the communications system has to be affordable. The government, because of its regulatory power, because of the conditions that it was able to institute in the transactions regarding the old system that the federal government owned, because of its ability to finance communications systems, has helped enable us to build this system that is very important to maintain. Even though moneys are going to become more difficult to help sustain the kind of system we've had, I think we've got to insure that some means of affordable communication exists in Alaska. We do have a tendency, because of the vastness of Alaska, to be insular by region; but I think that the kind of unity that we've managed to build over the years needs to be sustained.

Education is very important as well as economic development. They are two interrelated issues that we have all, in one way or another, been working on over the years. We've had advances in technology, we've had improvement in the housing conditions. Almost everything that's happened in rural Alaska we found costs a lot of money. That's a price that has to be paid and for some of us who have been involved in some of these changes, we've not always had the wisdom to understand some of the negative aspects of changes and, as was mentioned earlier, technology is sort of neutral. It has some positive angles, but like a lot of other things, it also has its negative aspects. And even though I did not attend the session the last day or two I think you probably heard some of that. Our difficulty out there has been that we have not been very wise about what technological advances we would accept and which we wouldn't. But when we had the combination of changes that took place, we all assumed that every technology that was introduced was going be good. And that goes in a whole variety of areas, not just communications. With housing, the improvement in housing really wasn't an improvement in many cases because the architecture, and the design, and the materials were just outrageous and the way they were put together. They just cost the people more money to house themselves. Larger houses that cost more money to heat. Even electricity, I found in later years as I thought about it, we had to have 80 percent of the people agree to electricity before we would come into a village.

But the truth of the matter is it's hard to stop the human desire for some leisure, an easier way of life. And in my own mind I thought that people would use restraint. Whereas, before they had jusr one bulb, I thought maybe they would just use two bulbs, or three. So that the student could stay in one room and study and not have to be in the one room where the Coleman light was. But the truth of the matter is, they wanted their drills, they wanted their stereos, they wanted their refrigerators, they wanted their freezers, and so the cost began to escalate. And the same with communications technology; I mean it's a phenomenal tool, but, ultimately the best communication is human communication, one to one between the generations. And I think we've lost some of that. Even though it's okay to speak, it's better to speak by a wire or by an electrical impulse of some type than not talk at all.

But I feel that we have to be cognizant of the fact that there are some negative seeds in most technologies. If we had it all to do over again, in all of these changes that have taken place I think we would have thought a lot harder about the ultimate effects on human beings. Right now most rural people are more than just consumers. That is at one point we were just laborers and just consumers and we had no involvement in industry or business or commerce. And so today communications is even more important. I mean we couldn't operate the Red Dog Mine, for instance, without a good communications system and without computers. And our people are into that now. And I hope whatever system that we develop can continue to include the rural communities and enterprises that we're working on. That's basically my comment. I know I went over my ten minutes, but I worked hard, six o'clock this morning, to come up with these ideas so I wanted to make sure they got out. Thank you very much.

McKAY: Thank you. We're opened up for questions if any of the panelists have any comments, reactions to the other panelists. We'll go ahead with that, otherwise we'll start with any questions from the audience. One thing that Willie came back and touched on at the end of his remarks, but one thing that occurred to me in the last day or so is that, there was a comment on the panel that technology is neutral. Certainly there was a comment read the other day quoting another Native leader who said that. I think the clear gist of it was that, technology may not be neutral in the sense of the impact that it has on a culture. Do we assume that technology is neutral? Do we assume that technology really does carry with it some negative seeds, as you've said, but we accept it, or that it's inevitable? Or, do we really assume that technology is neutral, that we just let it come in and depend on the rest of the environment to shape that and use it in the culture?

HENSLEY: I think the problem is that human beings are weak. We have no will. And I can remember when satellite television first came to Kotzebue. It used to be we had one channel and it was on from like four o'clock until ten o'clock I think. I used to love to visit my sister because I did a fair amount of traveling and I didn't get a chance to visit her very much. Well, when four o'clock came along, heck, she was gone, I mean she was watching the tube because it's such a powerful medium. And so I think, I do not know what the report was yesterday on television but it has the potential for great good and knowledge. But, along with all the other things, it has made us weak. I mean, as a matter of tradition we generally we're in pretty good physical shape out there. We've had to move about a lot. But we've become real sedentary, too. Between the four wheelers and the TV, I mean, we're just turning into soft people. Television is a two-edged sword that, unfortunately, needs to be used in a more positive way.

McKAY: Let me direct this to Commissioner Foster. You indicated that one of the challenges that you have is making sure that the new technologies of the '90s are disseminated to rural Alaska. Is there a threshold question that needs to be asked about the value judgment of disseminating these new technologies, or is that something we just do to the extent that we can to achieve some sort of a parity of opportunity? And that anything else, essentially, your paternalistic, romanticized view of how we should approach regulation.

FOSTER: Well, let me wear two hats in response. First as a regulatory utility commissioner I think we clearly have the charge to insure, as best we can, the availability of those services that are, and here's the rub, considered basic service. And that the problem we have, I think, is that that definition is changing with new technologies. And that therein lies the value judgement. But as a utility commission, generally speaking, I think, as an agency, as an institution, we would be primarily driven by the desire to make sure that those things are available.

To take off that hat for a minute, I think, as a personal opinion, the view that a lot of people have that technology is neutral is just a little misleading on its face. There have, as we've heard here today, been a number of technologies that are new and introduced, and they have effects, positive and negative. We trick ourselves if we consider them to be neutral because they do have values associated with them, television being a good example, and those values may change as the technology is deployed. 900 numbers come to mind as one area where you go, well, 'Is the technology neutral?' And I go, well I wonder about that because at least during the last few years as information services have been introduced in a number of states across the country, they've been dominated by things that are of at least of questionable value. And we may be getting over that hump as it develops and people mature and along with the technology itself and what's available as we set up rules. But anyway.

McKAY: When you regulate, I guess it's been a while since I looked at the statute, but I think it still says something to the effect that you regulate in the public interest, convenience and necessity. When you regulate in the public interest do you take into account what you and the other commissioners sitting here in Anchorage listening to all the people that come in and give their pitches to what you should do, do you take into account what's good for the village of, whatever it might be, whether its Kotzebue or one of the ones we heard about yesterday? Whatever village, do you decide what's good for the village or just what should be available to the village?

FOSTER: I think generally you'd find that we would say that our mandate is to provide that basic service. And, so we probably don't get to the level of the value of 'Is this service good or bad?' It is simply, it's a service, it's available, whether it be voice mail or any other particular kind of service, or basic phone service still in some locations. And, so I think we are driven by that policy issue.

McKAY: There's a question.

HERBERT DORDICK: I want to make one comment. I think we grievously underestimate the power of cultures and the good sense of people. When in fact we can just look around and see how many products have been thrust upon the marketplace that have been rapidly rejected by the public, because they had the good sense to know that they're valueless.

Conference participant Tony Ramirez of RATNET.

Years ago, when television was introduced, for example, to Indonesia, there was a great fear that the Balinese culture would disappear. That people would no longer enjoy, or want to enjoy, Balinese dancing. Instead they would be watching whatever television would put on. American soaps, comedies, et cetera, et cetera. Well, that did not happen. Balinese dancing went on television and more people in Indonesia saw Balinese dancing than they ever saw before.

The same thing happened in Thailand when the Thais got television. Everybody said that the Thai culture would disappear. Well, that did not happen either. The students in universities picked up the Thai, recaptured the dance and the song and the poetry and put that on television.

The other thing that I see around us today is that when people, when the household, the family, is given an opportunity to once again recapture its conmmunicative environment, that is it's no longer controlled and regulated, when the household has the means to reregulate itself along its own values, it uses all kinds of means to control television — such as the VCR, such as the compact disc player, such as a variety of different, and all the new advanced telephone technologies, to once again become the manager of its own communications environment.

So I think there is a period of time prior to some of these new home information technologies coming in and the growth, by the way, of the VCR and the compact disc and the advanced telephone systems and I could go on, the FAX machine, personal computers, all of these have been very rapid because people are smart enough to know that I don't have to be controlled by the tube, and by the time schedule that the advertisers want to control me by. And I'm going to take a hand and rearrange my interior communicative life. And I see that happening slowly and I see it happening rather forcefully in American society.

McKAY: Rep. Brown.

KAY BROWN: What is the extent of basic telephone service penetration today in Alaska? How many communities are there where basic telephone service is not available?

GORE: I'll give you a definition that we use, and perhaps Mark would like to comment. We are required to serve in each community that has 25 permanent residents or more. That has been our goal and that goal was set by collaboration with government officials, and individuals, and so these are the marching orders that we at Alascom have. Now, technology, I believe, is taking us to the point to where you can possibly pick up some of the ones and twos.

You heard on the first panel about a wireless type communications that is called BETRS. This is Basic Exchange Telephone Radio Service that operates in the 450 to 460 megahertz UHF band. Right now the FCC has licensed BETRS for four channels. You can have four private phone conversations on each channel at one time. It works line of sight, 40-mile radius. So in some of the rural areas where you have 25 people or more and you have an earth station and there's pockets of people out from that location, this is a technology that is currently being deployed by one of our sister companies, and I believe, by United Utilities in some areas. On the horizon, I believe, the technology is there to provide that service.

Now, the critical part is the affordability and making sure that people can afford it. When I look at technology, and we've bantered around this thing about how neutral technology is. I believe it's very neutral. The application of technology has far reaching effects; and the application of technology is what changes your culture, your society, et cetera.

BROWN: Let me just follow that. One hundreds, thousands, people that want telephone service today that don't have it either because its not affordable or not available. I don't have a feel for it.

GORE: I'm not aware of that because...

BROWN: If the people who want it have access to it today.

GORE: If you look at a map that's lying on the table you'll see that it's filled up with earth stations. We started out, I think, with our earth station project and there were 35 as I recall. We have now exceeded 200, there are gateways, mid-routes and small bush earth stations. So I would say our small bush earth station population is probably over 150 villages. As locations become available, we sometimes are petitioned or requested to serve and we serve. If there is no local telephone company there, as quick as we put an earth station in one of the local telephone companies files at the commission and they compete over who gets the franchise for the local telephone business. It has worked in a few cases in the other direction where the local telephone company went in, established their switch, and then we were required to meet them.

McKAY: Before we go to the next person, I just wanted to follow up. There was a question yesterday or the day before about the difference between the lifeline concept and universal service concept. And I think last year or the year before here, we talked about the coming competition which is now a reality. The fear specifically was what impact that would have as the competitors tried to achieve the appropriate level of return on their investments. How would they treat the less profitable areas? Which we assume would be the most outlying areas, the communities with the fewest number of people. How would we address that? Either by regulation or through the competitive system? How is that being done? How do you feel that you have responded to that and will be responding to that in the coming year?

FOSTER: I guess I would be interested in the companies' response to that.

McKAY: Start with you, Richard.

DOWLING: Sure. First of all you have to divide availability of telecommunication into at least two categories. One is local exchange service, the other is long distance that connects the isolated exchanges. Local exchange service is currently heavily subsidized in rural Alaska under a federal program that is independent of the long-distance system in the method in which the funding, the subsidy is delivered. Long-distance service is a different sort of service. Typically, it is not subsidized. That is to say that every location earns enough money to pay for the facilities there. But as a whole the network pays for itself and there is a profit. In Alaska there is at least an argument that there is a subsidy that flows from the arrangement between Alascom and AT&T. The facilities that I described to you earlier today are intended to be able to serve statewide without the protection of that subsidy. That's made possible by advances in technology which we've all seen, and it's made possible by changes in the way that you operate the network so that you can operate it at lower cost.

McKAY: I think you mentioned in your March report on communities down to like the one dog-mushing couple out in a single community. I mean, are you basically saying that there's now affordable service available to any isolated pocket of people throughout the state?

DOWLING: That satellite will be launched in about two and a half years. It's currently under construction and it will provide service to anyone that wants it that's not situated behind a mountain that's in the way of the satellite. The same problem that we already have. The cost will be higher. You own your own equipment, just the way you own your own cellular telephone. And, you'll pay somewhere in the fifty cent to a dollar a minute range to use it. But for many people, and I seem to be the one to take the calls in my company, people who call in who are isolated and can't get telephone service, I talk to them about the future availability and they get quite excited about it. So that would become a reality. Today, as Jim Gore said, locations of 25 people or more, permanent residents, have not only long-distance service but in almost every case they have exchange service. They can call each other locally as well as making long-distance calls.

McKAY: Jim, did you do anything to follow up on Kay's question or the comments here?

GORE: I would like to address the affordability issue. I've been following the mobile satellite market structure, if you will. I believe a satellite is being developed by Hughes for this consortium that's on the order of $1 million per satellite. My view of this and my understanding of it to this point is, there perhaps may be a market niche: mining, exploration, park service, this type of arena that perhaps could afford this. For the average citizen I do not see that it is yet in the area of affordability because I believe the cost will be too high. But that is yet in the future and this is part of what we are all about here, trying to develop technology that will fit the marketplace. As to TDMA, you know, this is a technology that we have employed for some years.

McKAY: Can you just explain that?

GORE: That's Time Division Multiple Access. If you add to that, what has already been alluded to here, you can hit various points with this type of technology and it allows some economies of scale. I'm not sure this is the direction to go. Demand Assignment is something that we are looking into along with this technology. We still have some double hops within the state and the thing that drives us to double hops is the affordability question. Because you just simply can not afford to put in the technology that will give you the single hop. So one of the pressures that we are looking at is affordability.

McKAY: We'll take a question over here.

AUDIENCE MEMBER: First I wanted to make a comment about our friend from the East's comment and then I wanted to ask a question of Mark. I work with a local exchange company. We do provide technology to all people who ask for it. We've had only two communities around the state that have said, 'No, we don't want local phone service.' But in fact, if you remember, that's two communities that have said no.

I think technology is neutral in the sense that a gun is neutral or an internal combustion engine is neutral. But the effect of how you use it — killing other human beings, not being able to breathe the air — might not be neutral at all. My husband had the privilege of visiting some river villages. A man was building a skiff on the shore. The man said, "What do you see here?" My husband said, "I see you building a skiff. This is wonderful." The man said, "Yes, but you don't see any children here watching me build the skiff." That's been one of the effects of telecommunications in Alaska. That's because they were at home watching television.

Mark, I had a question for you and it has to do with local exchange telecommunication costs in the rural areas. We're really concerned that cost of our service to our customers is going to rise.

FOSTER: Which change in structure are you referring to?

AUDIENCE MEMBER: Having to do with the access rates and the way that we, the local companies .... We're wondering whether ultimately our customers are inevitably going to be affected because there is no intrastate universal service, no high-cost company buffer.

FOSTER: Okay. I think I understand your question. Correct me if I'm wrong. You're inquiring about the effect of the AT&T Alascom restructuring?

AUDIENCE MEMBER: No. I'm inquiring about the effect of the intrastate access charges ... I'm wondering what kinds of things you've got in the works on the intrastate side to watchdog those kinds of things.

McKAY: If I could stop you for just a minute. It may be an impossible request, but for the benefit of the people who are not as familiar with the telephone industry as many in the audience. If it's possible, can you sort of, in capsule form, explain, put a little bit of context into what this question is.

FOSTER: I think what the question's getting at is just recently in Alaska we have gone from a settlements method of paying for access to the local exchange company. The long-distance company typically paid settlements to the local companies and just within the last few years, and basically we've created a system where the local exchange companies, through separations and some other items, collect their costs for access and pool them statewide. So that ATU's costs are added together as the largest phone company with all of the other local exchange companies into a pool. And based on that pool, then the demand units are divided up so that a long-distance company pays the same unit rate for connecting to ATU as it does for United Utilities exchange or any other exchange.

I guess that is the commission's or at least the initial cut at, 'How do we make sure that access is affordable?' The initial cut was to say we're going to pool it. So that the statewide from a long-distance carrier point of view access is basically the same rate. And that's the first cut at it and it's really only been in effect for about a year so it will be interesting to see what we find from that system.

As an individual commissioner I'm interested in seeing what we can learn from that. The local phone companies can tell us, 'Is it working or not?' We'd be interested in that in terms of are the long-distance companies coming to your exchange or not, and if not, we'll figure out why not. We'd be interested in that.

McKAY: I just want to make sure. Did you want to follow-up with that answer?

AUDIENCE MEMBER: Well, you know, this could go on and on with my question. Some of the companies are really small as you're well aware. And, I'm wondering if they get into a posture of under recovery, at some point there has to be a catch-up or the company itself loses, and ultimately if the company loses the customer loses. The citizens out there in rural Alaska don't have local phone service anymore. I was just wondering what plans the PUC had to not allow that to happen.

FOSTER: I guess one of the presumptions that I make is if the company is under recovering it will come in and seek relief. There is some monitoring of the annual reports for companies to see, on a total company basis, do they look like they are whole and sound. And generally speaking, that review indicates that they are. So we really rely on the companies in that sense to say, 'We aren't healthy, we need some relief, we need rate increases' or some change.

AUDIENCE MEMBER: Yes. So the relief you anticipate is higher rates to the customer?

FOSTER: At least for the first round and to the extent that that becomes a problem then we would need to revisit the system.

McKAY: Okay. I've always wanted to say this, and I see the chance to. This is just to let our local affiliates know that we will be going a bit beyond the normal schedule. But, in fairness to the rest of the program, we're taking that out of the break, we'll take about another 6 minutes here and wrap it up. I know that there are a number of people that want to jump in. First Herb and then Alex.

DORDICK: One of the things that post-divestiture in the United States, local rates did shoot up very rapidly because of exactly the points the woman made, the financial settlements through access charges.

FOSTER: But the result of that is primarily separations. Wouldn't you agree?

DORDICK: It went from separations to the access charge. And then the local rates went up because the access charge, the access charges apparently did not match what the separations payments had been originally.

FOSTER: And a lot of the increase in local rates has been due to jurisdictional shifts.

DORDICK: Jurisdictional shifts and also the access line charge which the FCC added on for fear that the access use of long distance would not be enough and I think we have since learned that that access charge is not necessary. However, the way they continue to make local service available was to institute the lifeline service, the Link-up America service, and all kinds of universal services funds. Which has managed to maintain penetration and even increased penetration for those families who can qualify. And while it's not the best system, and while there are problems with it since it focuses on the wrong people, at the moment it's being modified. So the solution is either restructuring of the rates or one way of altering the pool let's say or just recognizing that there are people who need, if you will, telephone coupons, or a way of getting telephone service.

McKAY: Alex.

ALEX HILLS: There is an interesting connection between this conversation about rates and cross-subsidies and such and the very latest satellite technology that has been mentioned a couple of times here. In the university we've been tracking this mobile satellite technology for quite a few years now. As Richard said, the service will soon become commercially available in this country. As a matter of fact, in a way the future is now because the international maritime satellite is really of the same generic type as the new mobile satellites will be.

As a matter of fact, you can go out right now and in fact we are in the process of going out and buying an earth station that folds down into two suitcases. You can carry it anywhere in the world, unfold it, set it up and in a few minutes you're talking. So as I say, in some sense, the future is now although the cost on that is certainly prohibitive for most people.

We also have the prospect of the low earth orbiting satellites, which nobody has mentioned yet, but that's the technology which is expected to be a few years out where it's truly a cellular, truly a hand held unit that you can just work right in. And that service is coming out of, probably being owned and controlled from somewhere outside Alaska.

The ties to the rates and subsidies are the following: If those kinds of services are going to become available, and it seems likely that they are, and if there continue to be cross-subsidy arrangements in order to have certain services support other services, and so on, in the ways that have been traditional in the telephone industry, then it's interesting to contemplate whether that's a consistent and compatible situation. In other words, the new technology potentially constitutes the ultimate bypass. Go right to the satellite and you bypass all of the infrastructure that's been put in place.

I think this is more in the line of a question than an answer, but it is interesting to kind of contemplate the connection between these two and whether the kinds of cross-subsidy arrangements that have been traditional in this country can continue to survive in the context of that kind of technology.

McKAY: Jim, why don't you.

GORE: I want to say this about your question. There are two things that are in place. You have to split up the marketplace into interstate and intrastate. For the local telephone company there is a high cost fund, as administered by NECA, and then what Mark was talking about is the mechanism that has been set up here to protect the small telephone company so that they can give you rates at an affordable price.

McKAY: Okay, let's give our panelists a last chance, if you like, to make any final comments, either respond to Alex's comments in the form of a question here, if you want to do that or anything else, and then we'll take a break. Richard.

DOWLING: I would like to make one comment in regard to what Alex said. Alex and I have talked about this on a number of occasions. And before anyone gets really concerned about the bypass issue, the total channel capacity of these satellites, the mobile satellite, while excellent is not large enough that everyone in the world can have their own phone. It's not even large enough that everyone in rural Alaska could have their own phone. We're looking at mobile satellites to provide service to individuals who are isolated, to people who have boats, airplanes, that sort of thing. And in the very smallest exchanges to trunking to those exchanges where you connect and pay access charges just as if you had used another technology.

I don't think that everyone in the village is going to buy a mobile satellite phone and pay even 15 or 20 cents a minute to call across town when now they can pay $25 a month flat and call across town for free. And I would like to say one other thing and that is that the commission has set up a system with access charges which, in effect, replaces the separations and settlements payments. It's based on the original separations methodology themselves, that is that the revenue requirement for the local exchange for access service does not change, only the method by which they collect it is changed so that you can have competing long-distance carriers.

McKAY: Mr. Foster, do you have any final comments?

FOSTER: No.

HENSLEY: No, I just am curious why you called it the Chugach Conference. No, honest, I don't know, some of you might not know Cecil Barnes but Cecil was sort of the founder of the Chugach regional Native corporation, and he fought mightily to try to keep a separate identity because, you know, the Tlingits were trying to move up and cut up his territory, and the interior, the Cook Inlet region. And, you know, he did survive and I asked him one time I said, "Where does Chugach come from?" He said, "Well, it has something to do with being fast." So you might have appropriately named your conference because after all communications is, I think, it's just a variation in the pronunciation of Chugach.

GORE: If I could leave you with this thought. I read somewhere last week there are two kinds of people, those who do the work and those who take the credit. Try to be in the first group, there's less competition there.

Putting Information Technologies to Work for Economic Development in Rural America

I came here to talk about the study that Linda Garcia and I just completed on the role of information technologies in rural economic development. When I talk about information technologies I take them to include telecommunications technologies so throughout I'll cover these terms interchangeably. Before I turn to talk about technology, however, I want to take a step back and ask a few fundamental questions. These are questions that we heard throughout the course of the investigative part of our studies.

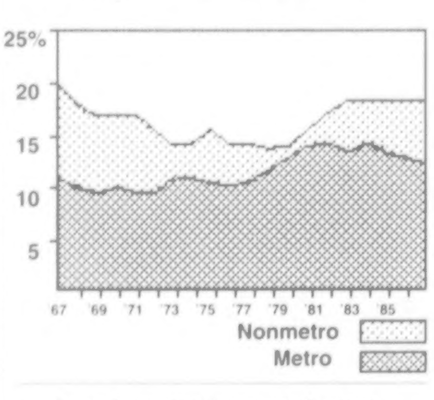
The first question is, 'Why save rural America? I think there are a lot of people inside the Beltway in Washington and a lot of people in the academic communities who say rural America is really facing some tough times but the fact is we live in an urban society and maybe it's better if we do move things towards this urban society.

I just want to share a few statistics about the state of rural America right now or within the last few years. By any poverty measures or per capita income measures, by measures about migrations, this confirms the notion that rural America is in a state of crisis and people are leaving and they are leaving in droves. In the 1970s we saw a lot of people moving into rural America, which seemed encouraging and seemed to indicate a trend in our society toward a more balanced approach to economic growth. But that's been significantly changed in the last few years. Another important statistic I think when we're talking about economic development is health care indicators. We see that between metro and non-metro residences infant mortality is consistently higher in non-metro regions, the levels of chronic disease are consistently higher, and overall measurements of health are consistently lower.

So again in all regards rural America seems to be in a real state of crisis. What's more discouraging, I think, is that this looks like it could be a permanent state of crisis. Structural changes in the national and the global economies have really shifted the advantages away from rural areas. Globalization has increased competitiveness for us all, and I think in the last decade we've all felt the pressure of that. Environmental constraints have fundamentally limited the options of rural areas, and we can see this to some extent in Alaska and the Pacific Northwest with the logging industry, with mineral extraction. These are all finite resources, and they are resources that are increasingly under question as to the degree to which we can make use of them or make use of them in the present and that's important to consider.

There is also a shift to an information-based service economy, and that's part of this globalization trend. They're really reinforcing one another, but that's important to consider in the context of rural America because rural areas have always lagged behind urban areas in their access to

Poverty rates by place of residence



Source: Table in *Rural America at the Crossroads: Networking for the Future*, Congressional Office of Technology Assessment, January 1991, based on Bureau of the Census information.

'We've established that rural areas are looking at some possibly pretty grim times.'

Sherry Emery **worked for the last two years for the Congressional Office of Technology Assessment. She is co-author of *Rural America at the Crossroads: Networking for the Future.* She is a Ph.D. student in city and regional planning at the University of North Carolina.**

communications and information technologies.

So here we have it. We've established that rural areas are looking at some possibly pretty grim times in the future, and some people say that's fine. Let the market take care of itself. We don't need to worry about rural America. But it is important, and I think we all have a sense of that. It's 25% of the United States population still, and it's where a lot of our national resources exist. And in a global economy we can't possibly conceive of going into the competitive arena with only 75% of our resources or less than that if we consider that we don't necessarily use the full span of our resources in urban areas. So I think that it's important that we consider rural America a *critical* part of the whole package of American competitiveness.

As we talked in Washington, D.C., this was a nice little angle that we could bring in because competitiveness seems to be the buzzword, especially within the Beltway and seems to get people's attention.

AUDIENCE MEMBER: How again is rural America defined?

EMERY: Rural America is defined.... We use the Census Bureau definition. We're kind of establishing an amalgamation of definitions between the Census Bureau and the Bureau of Labor Statistics, and it's related to population density and adjacency to a metropolitan area. So we used quantitative measures based on those statistics, but we also used qualitative measures because a lot of places that are classified as rural are really suburban and don't have very rural characteristics.

AUDIENCE MEMBER: What's an example of a rural vs. ... like is Montana rural?

EMERY: Montana is a primarily rural state. The metropolitan area of Washington state, or Seattle I should say, is metropolitan and as you get further away there is increasing tension, and I think the Cascade Mountains provide a pretty strong barrier between rural Washington and urban Washington, of course, except when you get to Spokane. There is that kind of fundamental difference.

AUDIENCE MEMBER: How would that relate to Alaska?

EMERY: How would that relate to Alaska? That's a good question. In fact, when we went about studying this problem we explicitly excluded Alaska because it was so unique and so predominantly rural. So I've been trying to brush up a little bit on Alaska in general, but you all have some unique characteristics here and I think in the population being so dispersed and yet so concentrated in Anchorage, I would say we would classify it as a predominantly rural state. So with that little caveat aside, I'd like to get into kind of the meat and potatoes of what I'm here to talk about.

First I'd like to ask what is economic development? What are we trying to accomplish in rural areas? And then turn to how can telecommunications and information technologies help? I'd like to take this approach because we tried in our study not to be technologically determinist. I think that it's difficult to really say that technologies are neutral. Maybe on balance they could be neutral but there are very positive and very negative attributes, and I think in order to conceive of the problem properly we need to look first at what we're trying to accomplish. After we look at how telecommunications and information technologies can serve our notion of economic development, then I'd like to turn to some of the obstacles that you all might be very familiar with in trying to make these things work. Then finally I'd like to talk about some of the ideas that we came up with that the federal government could work with to help alleviate these problems and also how state and local political bodies could help this as well.

So first of all, what are we trying to accomplish in rural America anyway? When we started this study and we told people that we were looking at information technologies and economic development, people's eyes lit up and they said, "Oh, I know what you mean. You're talking about taking back office functions to places like Sioux City, Iowa. That's great. There's tons of jobs there as a result of VISA doing its bill processing back there." And we thought about that and paused for a minute and looked at the nature of the jobs that were being created by this development, and it became apparent pretty quickly that these were all minimum wage jobs with little opportunity for advancement and they weren't necessarily that permanent. We're already seeing a lot of the financial services data processing jobs going overseas, precisely because of telecommunications, telecommunications can allow us to make use of even lower wage rates in places like Jamaica or Ireland or Indonesia. So calling that economic development is a little bit questionable, and I think that we need to think of a more comprehensive definition of economic development.

'It became apparent pretty quickly that these were all minimum wage jobs with little opportunity for advancement.'

It's also important to note that economic development is many things to many people, especially in rural areas. As we traveled across the country and as I listen to some of the anecdotes from Alaska, I think that point is particularly critical. When we went to New Mexico and asked people, "We're from the government, we're here to help you, what can we do?" not only did they kind of bristle in skepticism but they said, "We may be impoverished according to your definitions of poverty, but our life is rich in ways that you can't possibly understand coming from Washington, D.C." That's a very sobering notion, and I think that might be pretty clear to you all here that experience that type of cultural diversity in Alaska, but I think for politicians and policymakers inside the Beltway and inside the urban areas that's sometimes a missed point.

Therefore, for our definition we want economic development to be flexible enough to accommodate the diversity of contemporary rural America and to allow for alternative approaches to the problem. Also we want to conceive of economic development as a multi-dimensional process — not a single goal or end result — and in conceiving of it as a process it's important to focus on the linkages between the community as a social system and the economy, and I think these linkages are particularly important in rural areas.

If I think about going to a rural area because an attractive job might be there, I also want to consider whether my kids will get a good education or whether I'll have access to quality health care. And in rural areas these social linkages are not as redundant as they are in urban areas so if the school closes down we're sunk whereas in an urban area there's always another school. It might be a little more inconvenient, but it does exist. Or there's another health care provider to which we can turn. So these links between the community and the economy are particularly important to consider in economic development in rural areas.

Traditional economic development approaches really focused on business opportunities, ignoring the other aspects of the economy or at best presuming that those aspects would come along as long as the businesses succeeded. These quality of life considerations that I mentioned before, however, need to be considered inputs as well as products of economic development. Based on this notion of economic development, we came up with some goals that I think could apply to pretty much any economic development plan.

The first is the goals of employment and income. These are pretty obvious at first glance but it's important also to note that in addition to income, jobs provide workers with an identity, with personal satisfaction, with status in the community, and with a stake in the socio-political system. If we're talking about sustainable development, these are all very important qualities to consider.

Secondly, health care. A healthy population living in adequate housing is a minimum standard for community welfare and for a productive work force.

In addition, a well-functioning government sector that can provide police and fire protection is important to the local economy. So again we see the linkages.

Education is also a critical part of these more social goals. The level of education really determines the ability of people to get good jobs and to adapt to change. This is an important point that I think has often been overlooked in rural areas precisely because they've been able to rely on extraction and agriculture and industries like that that don't necessarily demand a formal education, but as we move into a more service-oriented economy and a global economy these skills that tend to come with a more formal education are increasingly important.

Finally, stability and vitality. Those are kind of two sides of the same coin. Even though stability seems like it might be stagnation, I think that stability with adaptability is something that we need to strive for. If we achieve this, we can be assured that economic development will be done *by* rural communities, not *to* them. And if this is the case, then the benefits are more likely to occur to the community and not to some outside developer or some outside firm that comes in.

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In saying all of this about outsiders coming in, that's not to preclude that as an option for economic development, and in a lot of places the only viable option is for the government to come in and set up some government activity or an oil company to come in and that becomes part of the local economy. But it is also important to consider the balances and the tradeoffs and how do we keep these things there once they're there?

In many cases there are obstacles to achieving these goals, and many of these present a catch-22 in that they're interrelated. Low education means that high-skilled jobs that might come to an area might go unfilled by the indigenous people, so the economic development scheme would not benefit the people of the community but would benefit the people who are brought in to serve in the high-skilled jobs.

'Developing the local leadership so they can orchestrate change might be an important strategy.'

Lack of health care is a barrier to development, but it's also a symptom of low economic achievement. Local leadership is sometimes also a barrier and a prerequisite to economic development. Whether that leadership comes from the local government or the businesses is not important but that the leadership be there is essential. Comprehensive development requires forethought and coordination, yet sometimes these are luxuries that you can't really afford when you're in a state of crisis or a state of trying to get by to the next month.

So in some cases I think economic development and particularly in rural America is really a difficult negotiation, and we need to overcome a lot of obstacles. The strategy to doing so would be different depending on the factors in the local economy. This may be an obvious point, but it can't be emphasized too much.

We identified four strategies that varied according to the different situations. In a very socially impoverished region building individual capacities might be the first thing, and that might require some direct assistance. In other communities, getting the business activity in there might be a viable approach to really helping the community. In other cases, developing the local leadership so that they can orchestrate change might be an important strategy. In most cases it'll be a hybrid of these.

Once we look at economic development and look at the various strategies, we can then begin to identify how technology can serve these goals and these strategies.

We're all aware, especially with regard to the first option, of how telecommunications and information technologies can help serve education. Alaska has been a pioneer on that. Alaska's really been at the forefront and even though we didn't formally study Alaska in our research for this we referred to the examples of Alaska frequently with regard to the distance education.

In health care, information technologies can make a critical difference. They're no substitute for a physician or for a primary health care provider but often they can improve the level of health care to a level which would allow people to stay in rural communities and which might allow the physicians or primary health givers to remain in a rural community when otherwise they might not. For instance, distance education tools can provide professional development opportunities and activities that are missing for physicians in many rural areas. The increasing power of these information technologies can actually improve the care available because rural physicians can send X-rays or EKGs or other medical images over the wires or through the air to urban research centers for distant consultations and that can make an important difference.

Information technologies and telecommunications can improve the quality and the efficiency of local governments. Enhanced 911 services — I'm not sure how available they are throughout Alaska — are an important example where people can call up on 911 and the fire station or the police response unit automatically knows where the problem is, so that if the people are in real trouble they can be reached without having to communicate much themselves.

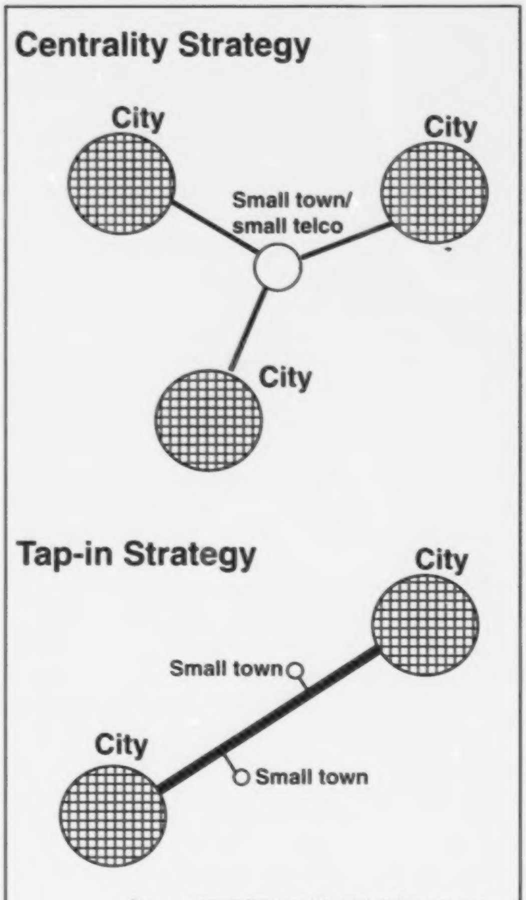
The uses of information technologies in business applications are well known and are just mushrooming. They can be used to identify capital, they can be used to identify markets, to reach markets, to bring markets to a rural area or to bring rural products to an urban market. Again, we heard examples when we were traveling. I'm not sure if this is a *real* example and maybe you all can advise me on this later, but we heard of some Indians here in Alaska marketing salmon to Macy's over telecommunications wires. So even if it's not real, it's an interesting example, and I think it's useful to draw the lesson from.

So we see that telecommunications technologies are increasingly necessary in a global economy. Without them rural areas will be shut out and isolated from the rest of the global web of economic activity. We also see how these technologies can address a variety of economic development goals and help overcome many of the obstacles that rural areas face in the global economy. Now it's important to turn to some of the trends that affect rural areas' access to these technologies.

The first, which you all are pretty familiar with I imagine, is the divestiture and deregulation of telecommunications which provided a double-edged sword for rural areas. On the one hand it took away a lot of the subsidies that enabled rural areas to get telecommunications in the first place, but on the other hand deregulation allowed for innovation and finding new ways to configure technologies to suit local needs. Since divestiture is pretty much a fact of life and they're going to be grappling with that in Washington for a long time to come, I think it's very important to focus on the innovation and the new services that might be able to help rural areas and to figure out how we can bring these things together.

I made a list of eight technology trends that affect the communications infrastructure, and the sum of these trends that is really important is the ability to network. We're all familiar with local area networks and the sharing of capacity. Metropolitan area networks are increasingly being used where many businesses in urban areas share a broadband capacity and sophisticated computer resources in ways that allow them to afford things that they wouldn't otherwise be able to afford. This is a really exciting trend. At first glance it looks interesting but it looks advanced compared to the needs of many rural communities, especially when we're talking about getting basic telephone service out to a rural area. But if we take another look at this in kind of a functionalist approach and consider how we're looking at economic development as a more comprehensive package of things happening, then something like a metropolitan area network begins to make sense.

We came up with something we call rural area network. Instead of being arranged along business lines, it's arranged along geographic-shared lines so that you have the local government and local industry and local health care providers, the educators, businesses sharing capacity in a way that several businesses share capacity in urban areas. I'll go into this in a little more detail and what some of the difficulties in doing this are as we go on.



Source: Harmeet Sawhney, University of Texas at Austin, contractor material prepared for the Office of Technology Assessment, January 1991

In each of these cases, while the hospital could benefit from telecommunications, the occasional use of sending an EKG or getting an urban consultation doesn't really justify the cost of sophisticated technologies, and similarly the school might not be able to alone afford its own distance education technologies and the local businesses may well be able to benefit from access to sophisticated technologies, but there's no way that they can justify these costs if they're considering just their revenues and their costs. But with a shared arrangement all of these elements could come together and each could benefit from the technologies that none could achieve alone.

An important benefit that we see with a rural area network is that of enforcing community. We heard earlier this morning how people's nature inclines them to communicate with one another whether it's with smoke signals across a bay or with a telephone or with electronic mail. I think that technologies can be used to enforce community and if we employ them in a multifaceted economic development scheme, they really can be a very powerful tool.

Just as there are several approaches and strategies to economic development that are appropriate in different situations, the sharing arrangements also vary... the technological approaches. Here are three examples how we conceived of these sharing arrangements. One is the centrality strategy where a small telco or a small town invests in the technology and aggregates the traffic of several bigger towns or cities through that and generates the revenue. We saw that in eastern New Mexico where the Eastern New Mexican Telephone Cooperative invested in a signaling system 7 switch and actually diverted traffic between Albuquerque and Denver because they had the sophisticated switching and got all the revenues and were able at the same time to provide the people of eastern New Mexico with sophisticated switching services that would never have been available had they not been able to work out this kind of arrangement.

Another is the piggyback strategy where small towns or small users can piggyback on big telecommunications users. Often the university system or the state telecommunication system provides a nice backbone for other people to piggyback on. The final example we give here is the tap-in approach where two big cities may have sophisticated communications and broadband capacity; small towns can tap into that.

There are several barriers to achieving these types of arrangements both in very practical terms and in kind of policy regulatory terms. I'm going to talk about the regulation because I think that's a difficulty that we can solve most immediately if we really put our minds to it. The current regulatory climate is often constrained to view communications as an end in itself. I say that because we spoke with several state regulators who said, "It's in our mandate to make sure that customers' rates don't go up by more than X amount each term." That's an important constraint to consider and that doesn't allow them to think of the opportunity costs involved in not having access to these services. And that's an important consideration, especially as we move into the information age and are part of the global economy. If we're shut out, that's a huge cost that accounting checks and balances don't take into account. Because telecommunications regulators are often constrained by this, they're forced to let demands drive technology deployment.

'When demands drive technology deployment, spotty network development and questionable interconnectivity often happen.'

In rural areas when demands drive technology deployment, spotty network development and questionable interconnectivity often happen. I realize in relying more on satellite technologies that that may not be as much of a problem in Alaska, and I'll be interested to hear some of your comments about that. But it certainly is a problem where we rely on wire-line technologies to connect everybody together. So we're faced with a tricky balance. Our society is based on unevenness and competitiveness, and there are some aspects of the technology that you and I as residential subscribers don't need and that businesses should really pay for. So, it's a complex problem that regulators are going to be grappling with for a long time.

There are a few other more tangible regulatory considerations and a couple of them I've lumped in the category of technology diffusion. In those is depreciation rates, which can affect the rate of technology deployment. The quicker a firm can recover its costs the quicker it can turn over its investment and get sophisticated technologies out to rural areas. Of course, the tradeoff is that you have a higher bill each month because the capital cost is absorbed earlier in the process.

Another issue is cable-telco cross-ownership or information services provision. Again this is a very sticky regulatory issue but in rural areas I think it's something that can be solved and is being solved. Oftentimes it makes sense to have one conduit to homes. The distances that we have to pass to reach rural consumers and the low density of consumers mean that it's just prohibitively expensive to lay wires out to many of the rural customers, much less duplicate the wires. So those are two issues that are going to have to be resolved. In Washington last year they passed legislation to make the exception to the cross-ownership ban up to 20,000 instead of 2,500 so now towns up to the size of 20,000 can have cross-ownership or offer information services.

The second barrier to deploying technologies out to rural areas or making use of technologies for economic development purposes has to do with affordability. This means that if it's more expensive for rural consumers and businesses to call one another or to call to urban areas, that's a barrier to development. I see that myself in Chapel Hill. It costs me $2 to make a phone call to Durham, which is two miles away, because it crosses an exchange boundary. This is a booming area so it's not very much of a sad example, but the real consequences are felt in more rural areas.

LATA boundaries are also a problem in that regard. The University of Maine wanted to extend its broadband fiber-optic distance education system to include some other New England states, but the limits that pertained to cross-LATA telecommunications prohibited them from doing so. That was really very unfortunate for, especially, the neighboring borderline communities.

So there are some real problems in figuring out how to bring people together to share capacity or how to bring the providers together to share capacity.

Another example I'd like to share is with the Bloomsburg Telecommunications Network. In Bloomsburg, Pa., they again encountered the exchange barrier problem. Bloomsburg University got together and planned to pool the demand of the local businesses, the public service corporation, the emergency medical service and aggregate it so that they could connect with a DS-3 fiber-optic cable to Harrisburg where there was a point of presence for the long-distance companies and more sophisticated switching. They talked to the telephone company. Because of the exchange boundaries it was just prohibitive and they ended up making calls to bypass the network, which as we all know is a difficulty. The more people bypass the more costs are absorbed by those of us who are still on the network.

Conversely in Iowa, the Iowa Network Services, a consortium of 142 small telephone companies, got together to share Signaling System 7 switching and distribute that technology throughout their territories. They were held up for three and a half years in regulatory proceedings because the local Bell Operating Company claimed antitrust and brought them clear to the federal Supreme Court. They finally got that through last year, but the fact is that the regulatory arena exists and can be used to slow up technology deployment that could really help rural areas.

A nice example of regulatory flexibility that we saw was in South Carolina with the PalmettoNet where I think it was six small telephone companies got together and each invested in fiber-optic capacity within their region. They all linked together and formed a consortium and they shared the capacity so that they weren't limited to just their region. That required a lot of regulatory flexibility, a lot of corporate flexibility, and a lot of forethought, but it's an encouraging example.

The bottom line from these examples and the discussion so far is that in employing telecommunications for economic development, creativity is a necessity but it's also something that's sometimes lacking. This creativity is necessary on the part of users, on the part of regulators, and on the part of telephone service suppliers. We all need to become more sophisticated about how telecommunications can serve us and serve the goals of economic development.

I want to backtrack a little bit and note that throughout this I was referring primarily to fiber optics, but I think that the medium itself is not as important as the capacity. If we all think of information and the power of information as fundamental bits and bytes that can travel over satellites, that can travel over basic exchange telephone radio service, it can travel over coaxial cable, copper wires, the important thing is that it travels and that it be efficient and available and that people be able to afford it and really use it to their advantage.

Now I'd like to turn to some of the policy criteria we came up with for the federal government, and these fall pretty clearly out of what I've been saying so far. We envision an entrepreneur leadership that needs to be a multi-dimensional, holistic approach to economic development. I think holistic kind of gets a bad rap sometimes as a buzzword, but it's really what we are trying to conceive of. Flexibility is critical. Policies that incorporate technology transfer so that users have power to control the technology and not vice versa. Reconciling the telecommunications policy with economic development policy and realizing that in a global information economy technology and the economy are just inextricably linked. These have to be viable. There's not money in federal coffers to subsidize rural telecommunications as there was in the past, and I think there's a lot more of the skeptical eye so arrangements that encourage sharing are critical. That's the only way we're going to get technologies out to rural areas and allowance for choice. If people don't want the technology, it shouldn't be forced upon them. That's a fundamental tenet of all of our notions of politics.

As for a federal role, we identified three players that might be appropriate to deal with the problem. The Rural Electrification Administration was foremost, and we looked at the REA because they were so successful in the past in getting telecommunications and electrification out to rural areas. It's really been an agency in trouble in the last decade and it would need a fundamental realignment of its mission and a reinfusion of some vitality and creativity to make that work.

Cooperative Extension is another candidate for federal involvement. The work of the Extension agents and the land grant universities in the past has been critical to helping our agricultural economy move into the industrial age, and I think that a reorientation toward the information age could really make Cooperative Extension a viable unit in the future.

Statewide university systems like the University of Alaska and the University of Maine are very powerful presences in many communities, and they can bring together the educational component that is so vital and the technology and really facilitate economic development.

So all of these have a historical precedent. I think all of them have future potential. The bottom line is that we need to think about economic development anew, think about technologies anew and figure out ways to bring them together. And that's about the limit of my comments. If you have questions or comments or corrections, I encourage you to speak up.

DAVID EL'MAMUWALDI: You talked about South Carolina and its T1 network that was crossing LATAs, was that a decision for corporation....was that a political decision or was that among the different....?

EMERY: It was a business decision as I understand it from the telecommunications companies, and I think they had a little more flexibility on the part of the government because South Carolina is not doing so well economically.

EL'MAMUWALDI: I was very happy you brought up the SS7 aspect of telecommunications. That's a very important aspect in the future of Alaska — Alaska's communications network.

EMERY: Oh, really, how so?

EL'MAMUWALDI: It's forthcoming. It's about to happen. We'll join the rest of the world in becoming part of the SS7 network.

EMERY: Oh, that's great.

KAY BROWN: Did you look for specific examples of where rural communities were developing viable industries or cottage industries and using telecommunications technologies successfully? Did you find many examples, or is it just emerging now?

EMERY: Well, we heard of a lot of examples when we started the study, and when we began we considered looking specifically for those examples of success and then we decided to take more of a broad survey approach and look at where communications is helping and where it's not helping and asking people the more open-ended question of, "Where do you see your community going in the future?

How do you see telecommunications playing a part of that? Is that happening now? If so, how so?" We went to four states as part of our study, and we chose the states as the level of analysis because it was a nice juncture between local policy and federal policy. We toured just a gillion communities and talked to a gillion people and asked them, "What is economic development to you?"

BROWN: Are you aware of any communities of under 20,000 that do have cross-ownership of telephone and cable, or is there anywhere that this is actually being done?

EMERY: Yes, there are quite a few. The only one that I can think of right off hand is the Lincolnville Telephone Cooperative in Lincolnville, Maine. I forget the woman's name who runs it, but she's really dynamic and is excited about the two technologies. She runs her cable and telephone as pretty separate things, but the fact that she can own them together is important.

HARRIET SHAFTEL: Are there any predictions for the year 2000 about this 25% figure you gave us as far as the rural portion of the country goes?

EMERY: That's a good question. I haven't seen any from the most recent census. We published our report just as the census was coming together, so I really don't know, I'm sorry.

SHAFTEL: You mentioned rural extraction and agriculture as being two chief economic industries in rural areas and of course in Alaska you have to have to add a third which is subsistence, but are there any other industries that you see coming down the road or in the future that would be viable in rural areas if they could have this kind of telecommunications?

EMERY: Yes, I think a lot of rural areas, particularly in the southeast United States, are relying more on tourism and retirement communities. But Washington state is also doing that. Interestingly in New Mexico where they have a strong base of ex-military people and ex-scientists, there is a consulting community emerging because there is such a brain power there. These people can get consulting contracts if they can send the documents out over the lines and get information into them. That's an attractive alternative. There's a guy in Washington state who's doing software for Silicon Valley firms and transmitting them over the wire. So I think these technologies can allow some real flexibility and some creative people to remain in rural areas who want to.

EL'MAMUWALDI: Your study, is it available or is it going to be available?

EMERY: It is available. I'll show you what it looks like. Mine's all marked up, but this is it. It's available through the Government Printing Office, but your best bet is to call the Office of Technology Assessment, and they're listed in Washington. It's available by the Superintendent of Documents, GPO, Washington, D.C., and the call number is OTA-TCT-471 and the title is *Rural America at the Crossroads: Networking for the Future*. Published 1991, just about six months ago.

DOUG FRANKLIN: Did you identify any key electronic industries that are emerging that would be of use to rural communities, in particular cottage industries for instance?

EMERY: No, not for this study.

FRANKLIN: Did any come to light?

EMERY: I think software development is probably the one that comes to my head first in the persona of manufacturing technology or as cottage industries.

The Alaska Telegraphics Project: First-Year Results and Second-Year Plans

I'm all wired into my wireless microphone here which I guess is for the sake of the tape that's being made. It reminded me that we had a lash-up like this at Carnegie-Mellon last year for one of our programs. We used the same type thing, the wireless mike and an antenna that picks it all up. One of the speakers forgot that he had this thing on during the break, and he went into the men's room. The thing was still picking up...he was having a conversation in there. All of his students were still sitting in the classroom listening in on the speaker.

I always really enjoy this conference. It's like my life is flashing before my eyes when I come to this conference because public broadcasters are here, people who are involved in rural telephone issues, people with State telecommunications, people with University telecommunications. So this is the conference that has everything for me, and it's always really nice to see old friends every year at this time. John (McKay) asked me to say a word or two about my new position. I have been running the telecommunications networks for the University. Now they've thought of a few more things for me to do, and that includes not only the telecommunications networks but also the mainframe computers and all of the administrative applications that run on those computers.

One of the speakers this morning mentioned that Alaska is seen around the world as being a real pioneer in communications and the use of information technology, and talked about places like Australia, which have followed our lead and adopted some of the same kinds of ideas. What I want to describe to you this afternoon will be another variation on that same story. We've found the technology which we think has a great deal of potential for rural education, and that's the subject of my presentation, the Alaska Telegraphics Project.

What we've come to call "Telegraphics" actually also goes under a couple of other names and, for the sake of clarifying the terminology, I'll mention that the terms "telegraphics," "audiographics" and "interactive digital graphics" all mean approximately the same thing. I'll use those terms more or less interchangeably. "Audiographics" refers to the fact that what I'll show you is normally used in connection with audioconferencing. And "interactive digital graphics," well, it's a very interactive medium, as you will see, and that's where that particular term comes from.

The project is going on over a two-year period. It started July 1st of last year, ran through that academic year, and now we're just going into our second year of the project. We conducted a rather thorough investigation of the technology, which I'll describe to you in just a moment. I guess I'm building suspense here by referring to the technology but not telling you what it is. In the first year we did a rather extensive investigation of the technology and also spent a lot of time demonstrating the technology to University faculty, particularly those who are involved in rural education, in teaching courses in rural parts of Alaska. We got a very positive response from all the faculty who saw this technology, and that led us in the second year to put together a pilot project in which we're using telegraphics to teach some courses in four Alaska villages. The second year of the project is largely concerned with this pilot, and at the end of this year we'll be writing up a report and distributing it, summarizing what we've found.

Now if all of this is very successful, then the possible

'It allows those images to be added to, erased, not only by the instructor but also by any of the students . . . in this system all sites are equal.'

Alex Hills

is director of telecommunications for the University of Alaska. He has also served as director of the Information Networking Institute at Carnegie-Mellon University, was president of the first telephone cooperative to install local exchanges in Alaskan villages, and was general manager of the first radio station in Northwest Alaska. He was a deputy commissioner of administration in the early '80s.

outcome is that telegraphics will become part of the teleconference service that the University uses to teach in the villages. Many of you probably know that the Alaska Teleconference Network, managed by Alys Orsborn who's sitting in the back here, is part of our organization at the University. It's a very extensive network, and is used very routinely by University instructors to teach courses in rural Alaska.

What is telegraphics or what is interactive digital graphics? It's a system that allows multipoint visual teleconferencing. We're taking our audioconference network and we're supplementing it with a visual medium. The visual medium involves a personal computer at each location with a relatively large screen. It allow images to be put on the screen, on all screens simultaneously, and allows those images to be manipulated, to be added to, erased, not only by the instructor but also by any of the students in the conference. In fact, in this system all sites are equal. All sites have exactly the same equipment, so the same operations can be performed from any of the sites. I've got a little piece of video here to show you in a couple of minutes, but for the moment let me say that the characteristics that we've observed on this particular medium are the ones that are listed here.

Remember that many years ago Marshall McLuhan talked about cool media and warm media. If I remember correctly, radio is a warm medium and television is a cool medium. We feel subjectively that we're involved with a warm medium here, with an intimate medium, one that allows people to interact. I'll tell you what it's like. It's like radio with pictures. It's a warm medium, then with the visual component added. We feel strongly that it's a medium which is ideally suited for working with small groups. When I say small I think I'm talking about groups no larger than 12 or 15 people, counting all sites. With the configuration we have in mind you could have as many as five or six people at each site.

Various people have tried to compare this with video or asked us, "Is this better than video or is this worse than video?" We don't really think of this technology as competitive with video. We think that video is better for larger groups of people in a class, I'm thinking about video now in an instructional context, and we don't think that video has quite the interactive characteristics that this medium does. So I would put forward the idea that this particular technology probably complements video rather than competes with it as an instructional medium.

We found, in using the medium, that the teaching style that's most effective is considerably different from the traditional lecture style. In using interactive digital graphics, there is some preparation involved for the instructor, but the preparation is really not very onerous. It's not a big deal to prepare for and teach over the system. And that's one of the things that makes it user friendly to the instructor. College faculty are very often not very flexible people and not very interested in adapting themselves to a new medium. So what we've done with this medium is we've tried to make it as close as possible to what they're already used to doing. One of the elements of that success is that the preparation is kept more or less to a minimum.

The actual teaching of the class, the technique that we think is most effective, amounts to more of a guided dialogue with the students than it does to a lecture. Since it's an interactive medium, it allows the instructor to make a statement — that is present some material, hopefully in small chunks — and then to ask one or more students a question and invite them to respond. So the mode is really "statement, question, response." And from the experience that we've had so far, we feel that this is the most effective way to use the medium.

I'm going to bring Greg Moore up in a little bit, and I'm going to invite him to describe more about the experience we've had so far. Since Greg has taught on this type of system fairly extensively, I'm going to invite him to talk with you about his feelings about what kind of techniques are most effective on the IDG medium.

'Electronically you can highlight certain parts of the picture. You can easily draw boxes using any of the line widths or colors.'

Now to get right into the technology itself. As I said, the way this works is the instructor, as he presents his material, brings up images on the screen and can change those images. Any of the students in the class can also make changes to the images. The images themselves can originate from any of several sources.

The first source is the graphics tablet which looks like a pen and pad combination, so you can draw, and what you draw comes up on the screen. That's the first possible source of visual information. The second one is graphics software. That means that any graphics software package that you have on your computer can be used to create images, which can then be presented by telegraphics. The third one, and the one that makes this fairly user friendly even to an instructor who doesn't have previous experience with computers, is the document scanner. You can scan anything that you have on a piece of paper, a drawing or a sketch or some notes you made before the class. You can take it and put it down on the glass of the document scanner, push a button and it's on the screen. That's the approach that we expect most instructors to use when they first begin to use the system.

The last way of getting images into the system, and one that's really quite impressive, is through a video camera. We have an interface between a standard video camera, a standard NTSC camera, and the computer, which allows you effectively to use the video camera to take a snapshot. So, if we have an anatomy textbook with a nice color plate, then all we have to do is point the video camera at it, take a snapshot, store that frame, and then it can be sent out on the system and used to present information to the students.

With regard to using the graphics tablet — that's the little pad and pen combination — these are some of the features that are available: multiple line colors (that means you can draw in red, green and blue), multiple line widths (fine, medium and thick), and highlighting. Electronically you can highlight certain parts of the picture. You can easily draw boxes using any of the line widths or colors. You can draw boxes around anything on the screen. You can also erase. These are all capabilities that are available to the instructor and also to any of the students in the conference.

Now I'm going to show you a little piece of video. We're not far enough into this project that we've been able to produce a lot of slick video. But at least it gives you a little idea of how this all works. The video was shot in Nenana, which as you know is about 50 miles from Fairbanks and it's one of the sites in our pilot project. This is the graphics tablet, and this is the computer screen. Now you're going to see a pen color being selected. You're going to see the line width selected, and now you're getting a message from Nenana. This is using the graphics tablet. Just writing on the graphics tablet and whatever is being written comes out on the screen and simultaneously it's coming out on the screens of all the other sites that are connected to the network. Now we're watching Robin Turk. Robin is our village coordinator in Nenana, and we just shot this over her shoulder.

The pilot project includes four villages. Besides Nenana, the villages are Tanana, Fort Yukon and Tok. This semester we're using the system to teach Developmental Math 060, which is an algebra course taught by the University. In that course the instructor is an Athabascan Indian whose name is Ruth Evern. She's located in Fairbanks and the students are out in the villages. As a separate project, but over the same system, we have another math professor, Gary Gislason, who's using the system to teach a group of students in Tanana.

Robin now has brought up an image which originally came from a video camera. This is the human anatomy plate. That image had been stored in the system and she just at the flick of a button brought that image up on the screen so that she and anyone else who's connected can see it. Now she's using the erase feature (I mentioned that as one of the features on the system). She's using the erase feature to erase a part of that image. Now she's going over and grabbing a pen, and now she'll use that pen to make a note or an annotation. That's about all we have on the video, but that I hope will give you an idea of what we're talking about.

We think that one of the real primary modes of use, particularly for new people, for new instructors who have never used it before, is to use the document scanner. They can take line drawings or other written material and very easily put them on the scanner, push a button and have that information come up on all the screens. We have not been finding that people take a great deal of time to get used to using this system. This kind of technology has been around for a few years, but the recent developments are making it much more user friendly than it has been.

I'm just going to finish up with a small bit of slightly more technical information. The products which are on the market right now in this telegraphics category are a system produced by a company called Optel, an AT&T product called Scanware, and the one you saw on the screen comes from IIS Technologies, which is a subsidiary of Bell Canada. Bell Canada is the holding company for Northern Telecom and Bell Northern Research. In fact, the system you saw was invented at Bell Northern Research and now is being marketed by IIS Technologies. It seems to us that this is the product which has the most capability. For those of you who are involved with computers, this is the hardware complement that's needed to run the software and to do all the things I've just described.

Greg Moore

For those of you who are interested in the communications portion, all of the computers, of course, are interconnected using telecommunications. These are the telecommunications networks that one can use to hook the whole thing together. PSTN, of course, is the Public Switched Telephone Network. You can use an asynchronous network such as we operate in the University of Alaska Computer Network. You can use an X.25 network like AlaskaNet or you can use an Ethernet local area network. And that's of great interest to us in the University as we put our high speed network together using interconnected local area networks. We hope someday we may be able to use Ethernet to link the telegraphics network together.

With that, I'd like to bring up Greg Moore, who has a few comments to make. Greg has been working for me since the beginning of the project. Greg wears two hats. He is at the same time the manager of the Alaska Telegraphics Project and also is a graduate student in computer science at the University in Fairbanks. I think we need to acknowledge that Greg is the guy who introduced this whole idea of telegraphics to the state of Alaska. Out in Kotzebue in 1986, Greg put together a much earlier version of this system.

You know how the personal computer was invented by these guys in a garage down in California. Well, that's what Greg was doing out in Kotzebue in 1986 with telegraphics. He got some people interested in it. It was really his activities that have led us to start this project. So let me bring Greg up for a few further comments and then we'll take your questions.

GREG MOORE: I just have a few comments about the pilot project and how it's progressed to this point. We have just over 100 hours operating our pilot network. We have eight students in Developmental Mathematics 060 located in the four villages. Five of the students are Native Alaskans, and those five students also happen to be high school students.

The network, we've been able to operate at 9600 bits per second, so we've been able to maintain a very high data rate. We've been able to maintain a good level of interactivity between the instructor and the students. The students are very excited at this point about participation in the network. Discussions with the students seem to indicate that they feel that they have control over the video medium. To them it feels like they are controlling television and that sense of control seems to be a motivating factor for them.

The other thing that the students are getting from this is 24-hour homework turnaround. We scan in the homework from the students once it's completed. The instructor grades it overnight and returns it immediately to the student so that there is very fast feedback, sometimes faster than in the traditional classroom. This seems to have helped the students in the class put their attention directly on the subject material.

Another aspect of the system is that the students are sharing the problem-solving process with the instructor. In an audioconference, of course, there is constant audio activity on the network. You expect that. It's audio only. In this network we've noticed short bursts of audio activity accompanied by long bursts of interactive activity on the screen. The instructor describes the problem, places it on the screen, and invites the students to begin the problem-solving process in algebra. One student advances the problem a little bit, the instructor makes a correction, passes it to another village, that village advances the problem a little bit further. There is a great sense of participation in the intellectual process with the instructor.

Another element is that the complications of crosscultural communication appear to be simplified by this system. The complications which occur in interpersonal communication in the traditional classroom appear to be simplified by this network, and I've really got to describe this as preliminary. We've got a person experienced in instructional design, Dr. Ed Cridge, with Rasmuson Library, involved in the project. He is observing the students and using several research instruments to describe their participation in this technology. We think there are going to be some findings that concern crosscultural communication when the pilot project is over.

In closing, I might also mention that we are doing some low-level programming work with this system. We have some strong ties between the pilot project and the computer science program at the University of Alaska. We feel the State has a contribution to make not only in the area of applying the technology but also in moving the technology along and adapting it to the conditions in the rural areas. So we're excited at this point and moving onward.

HILLS: I'd like to elaborate a little bit on the last point. What Greg is too modest to say is that, in his graduate work for his computer science degree, he has improved the product that's on the market. In fact, we're involved in a negotiation with IIS to see if they want to buy those improvements and incorporate them into the product. So we're really excited about the idea that Alaska is not just a consumer of this technology but also to some extent is a developer of the technology. So let's open it up to questions for either one of us.

Jaclyn Sallee, director of Native broadcasting for APRN.

DEAN GOTTEHRER: Alex, what are the copyright considerations with scanners and cameras and video equipment?

HILLS (to Moore): Have you thought about that?

MOORE: Actually, is Steve Smith here?

HILLS: Steve, do you want to take a crack at that one?

STEVE SMITH: Well, I think as long as you're not going to store the image for any length of time and you're just sending it for a one-time use in a classroom, you can be under the educational fair use, but if you store it and use it repeatedly then you're going to have problems with copyright.

HILLS: I don't think this technology is unique. We have instructors faxing materials out to villages. We have them using Xerox machines. As you can tell, we haven't thought about it a whole lot.

McKAY: One thing you do need to keep in mind is that the public display of copyrighted materials is a separate infringement from reproducing it so a lot of times faculty members think, "Well, I'm just making a copy of this for internal consumption," but you put it out there in each of these communities and display it, that's a separate copyright infringement which is why you can check out your video, take it home and put it in your machine, but you can't bring in a bunch of kids from the neighborhood or all the neighbors and have a party displaying the videotapes. It's for private home use and that's something you need to know.

HILLS: When we deal with this, I can see we're going to have to get some of you to help us out.

LEN FRAZIER: A technical question. Greg said a moment ago that at one point a teacher would pass the problem along to another village. But do you mean are all of these sites able to send information back to the teacher at once or is it one channel that has to be flipped from village to village to village?

MOORE: The workspace is a shared graphics workspace and the protocol is fundamentally full duplex which means that all participating sites get their information all at once. When I said that the teacher moves to another village I meant in the logical sense in the context of the classroom he'll say, "Ann in Tok, would you take this problem now?"

LARRY WIGET: Bottom line, what are you seeing in student improvement?

MOORE: Last spring we ran a network in support of Gary Gislason teaching a Math 107 and a Math 108 class to Tanana High School. At the end of those courses the high school students were administered a set of standard ACT tests and there was significant improvement. I'm reluctant to lay that out quantitatively for you now because that wouldn't be fair to the person who is actually doing the analysis, but I can tell you that the scores that the students showed were significantly above the average for urban high school students entering as freshmen at the University of Alaska. It's very impressive.

HILLS: We're fortunate that we've gotten linked up with a school superintendent in Tanana who has really revitalized the system up there. His name is Vincent Berry and he's got a different sort of attitude. His attitude isn't anything like, "Well, you know, rural students have some problems and they really can't learn very much so we'll just have to do the best we can." His attitude is, "Rural students are really exceptional people, and they really have some very unique characteristics. As educators we've got to figure out a way to help them develop their potential, and we really haven't done a very good job of that yet." He's got enough enthusiasm to go around and just being around him is a real experience. So we're fortunate that we've been able to tag into someone like that. When he saw this technology he just wanted it right now and, in fact, Tanana was the first system we put in because he was pulling on us so hard to get it going out there.

AUDIENCE MEMBER: You mentioned the capability for full-motion video in a portion of your screen.

MOORE: One of the applied research topics that we're looking at is the potential for putting full-motion video in a portion of the screen and, given the bandwidth we have available, that is possible.

AUDIENCE MEMBER: If that's possible, then why would you limit yourself to such a small class size? I mean, there seems to be use of the lecturing tools, why limit it to four or five students in each location?

MOORE: That's a good question and the answer is that the technology was designed from the student level to the technologist rather than from technology to the student. This technology comes from a group of teachers who are teaching in a rural area and faced the problem and tried to design a technological solution to meet the needs of the students they were teaching. And so this first application has been toward geographically scattered small groups of students who could not cost effectively be reached by video.

HILLS: I personally got into this because I thought it might be cheaper because of its low bandwidth requirements. Now that we're into it, it looks to me like we're looking at a medium which is unique. It's different than video. It's like radio. It's interactive. Now I'm starting to feel that, even if you put the cost issues aside, there are some situations where this is likely to be the medium of choice. I was thinking about this this morning when there was a conversation about the characteristics of different media. I was thinking about the experiences we had in the early '70s in Kotzebue when we put in the public radio station out there. That public radio station was a way for everyone in the region to communicate. It just did wonders for the community. We had people sending in audio cassettes and putting them on the radio. We had Eskimo stories. We had just all kinds of things because it's a very easy medium to use. Whatever you say about video, you know that kind of thing has not played itself out in any major way in the Rural Alaska Television Network or in any other television project in Alaska. Now I have the same sense about this medium. It's so easy to use that people get on and they control the medium. Just like Greg says. It's kind of like you put the customer back in control of the process.

AUGIE HIEBERT: Do you visualize this as centralizing high quality teachers in one place and minimizing the need for teachers in the rural areas?

HILLS: I'm not sure I want to touch that one. Greg's willing to.

MOORE: He's not a student. We're hoping that this is a technology that can reach skills that teachers have developed in rural Alaska that are successful. For example, if there's a math teacher in Arctic Village who has been particularly successful in teaching algebra to Athabascan students located in the village, his skills can only be extended to the 12 or 15 students that he sees that year. With this system our intention is to take those skills that have been developed on site and possibly make his skills available to a broad audience in rural Alaska. So we don't see it as a tool for centralization; actually we see it as just the opposite, getting access to decentralized skills all over the rural areas of the State.

HILLS: Right now the University has rural campuses in places like Bethel, Nome and Kotzebue and each one of those has faculties with expertise in certain areas.You could have a faculty member in Bethel who happens to have expertise in a certain area and he could be teaching students in Nome, Barrow and other sites. Now I will say that the University has a little problem in cross-listing courses between its different units, but you have to be able to have students in different regions of the state, regardless of which one of the three universities they happen to be enrolled in, all taking the same course and all getting credit for it. So we're hoping that, with the technology in place, those kinds of administrative details can be worked out.

Thanks very much for your attention, and we'll talk with you during the break.

The Conference Participants Report:

'We are concerned about the use of information technology in state government . . .

JOHN McKAY: One of the things that Larry first visualized when he put together this conference made it somewhat different from other conferences, of more of a seminar approach, was this small-group concept of getting people together with a piece of talent that you have and creative energy and not only allowing you to interact with yourselves but to come back and share that. This is that time of the conference. Let's take the five groups. Just so you'll know what order you are coming up in, the access and privacy group is first, rural communication second, rural communication with telephone emphasis group is third, distance education fourth, and technologies and communications is fifth. All right, the speaker from the access and privacy group, please share some of the things you can think of.

DEAN GOTTEHRER: We did spend a fair amount of time looking at global solutions but finally brought ourselves back to reality in Alaska so what I'm going to be talking about is probably what we did not spend all that much time talking about but found fairly important at the end.

We are concerned about the use of information technology in state government and we are particularly concerned that the Telecommunications Information Council, which was established in statute from a bill that was introduced by Rep. Boucher a number of years ago, has not met recently, and that there is currently not an adopted statewide plan for information policy. So our recommendation is that the TIC should be revived and that the governor and top executive branch management should participate in policy development. The governor's commitment is essential, and that should lead us to a planning process that will develop a long-range statewide plan for information services and for information infrastructure. Part of that planning process needs to include adoption of standards in areas like data and architecture, and should be incorporated into the appropriation process and into the acquisition part of the process.

The state needs to recognize the value of information as an asset. Government should make its information available to state government managers and to citizens and businesses in useful formats. We need to emphasize that this is a tool for economic development and in that sense will help further the governor's agenda to increase economic development in the state.

We ultimately need to provide access to the information that this state has that's public to the public in order to comply with the open records law. We also felt that it was important that Rep. Brown's two bills, HB203 and 204, in education technology should be supported and we should expand in the public school system, emphasizing teacher training and support services.

We also talked briefly about the need to establish a national electronic conference, to discuss access to state and federal information; that it should be on Bitnet and the Internet. We are going to urge the Center for Information Technology to consider helping to sponsor that. We need to look to the University of Alaska computer network to provide a home through the listserve software that's available, I believe for free on Bitnet, that will provide a way for people around the country to discuss questions of access to state and federal information through a conference. We hope that would have a home in Alaska.

Essentially what we are looking to emphasize to the governor in the need for all this long-range planning and a statewide plan is that it will help him achieve his agenda for economic development; it will provide better management and efficiencies with fewer resources in a time when we need to be cost effective and we need to be able to do the same amount that we're doing now with less resources. We're looking for ways to solve problems and we want to find specific examples that could be used, where this technology could be used to solve problems.

We also think that the Telecommunications Information Council should be an education forum that shows state managers how the technology can be used and helps them find those policy areas where there are disagreements and uses the structure to make those policy decisions. And finally, one area in there that has not yet happened that we think that needs to take place is that the TIC needs adequate staff support.

McKAY: Next is the rural communications group.

. . . in the area of general communications we actually solved some problems in our group'

JOHN VALENSI: It seems that I was elected to be the spokesperson for our group by default. Nobody else raised their hand, I agreed to chair and suddenly I agreed to make the report as well. I would preface my remarks by saying our group is kind of an interesting one in that we have a real cross-section of people ranging from graduate students to those of us in government to APRN and just a real cross-section of people. Because of who we were and how our group was constituted, we gravitated it seems back toward RATNET television delivery a number of times. We tried and succeeded in dealing with some other issues as well, but again as I say we gravitated toward RATNET and I'll cover that one first.

I've told you why we gravitated that way. It had to do with the fact that I was there, Diane Kaplan was there, Tony Ramirez was and so on and so forth. We kept seeming to come back to that focus. One of the things that I had never thought much about before and it came out in our discussions was the fact we all know the budgets have been cut and RATNET over the recent years but I never thought too much about what secondary effects other budget cuts might have on RATNET. But it was pointed out among our group that it would be nice if we had more locally generated programming.

Beating that around within the group, we discovered that due to all the cuts in the local independent producers who no longer produce and the public broadcast people who no longer produce that in fact at the last RATNET council meeting we went from a scenario several years ago where we received a program request about once every three months and now we received none. An interesting side effect to funding cuts in other areas I suppose. We concluded that we have technology in place and that if we could in fact get corporations, communities and government involved in causing some of these things to be locally produced it would enhance the value of the product that is delivered by RATNET.

In the area of general communications — we actually solved some problems in our group. I thought that was interesting. I kept trying to remind people that we were really supposed to identify these rather than solve them. But we actually developed a couple of solutions in the process. In the area of general communications the Yukon-Kuskokwim Health Corporation had people in our group. We talked about the difficulty of delivering communications around rural Alaska in the general sense, both data communications and visual communications. That group was particularly interested in training at a distance. The health aides who work in that area frequently are from small villages, frequently are parents and it's difficult to bring them into Bethel to do centralized training, it's disruptive on their families. It was pointed out that if there was some way by video delivery or whatever other method to help train those health aides it would be prudent. We learned that some of these health aides work for as much as 12 months prior to receiving any training; which is a little bit frightening I suppose.

We talked about the kinds of communications in connection with the health delivery, we talked about the conduit for the delivery of training, we talked also about what we would consider here to be vital communications in an area like Anchorage; where we need to communicate visually as well as by voice between the health provider or the deliverer of this emergency service or non-emergency service back to the physician and how some form of visual communication, still pictures or something like this, would be of great use in cutting down the number of people that had to be transported to a doctor.

We identified a couple of things that we'd been looking at in connection with something else, and offered those up as potential solutions. A still digital video camera that somebody just recently started selling for under $1,000 probably with existing technology could be developed to send those pictures. So we identified a solution there.

The Alascom representative, Jim Gore, was part of our group and he offered up an interconnection with these guys to go back and talk to them later about some potential solutions. From that came a regulatory issue that I heard a couple other times in this conference and that is that many of our utilities have capacity that's unused in these areas. But the regulatory scenario prevents them from selling at a discounted price to somebody like me, you know, a group like the Yukon-Kuskokwim Health Corporation who is obviously providing a vital service out there. So we identified potentially one regulatory change or group of regulatory changes that might help delivery of vital services in remote areas where spare capacity exists.

We talked, even though it wasn't our purview here, we touched on distance education just a little bit. Again by virtue of the group's makeup that seemed naturally to occur. In the area of distance ed., we made our own comparison of the Learn Alaska project with the present LIVENET project and I suppose critiqued some of the things that were done wrong. A general thought that came from it all was that in a project like Learn Alaska one of the things that didn't seem to happen was that the work wasn't done as it should have been on the front end of it prior to it being funded, in that the folks who were receiving this service in some cases didn't actually want it. We ended up with a solution looking for a problem and we all agreed that was not a good thing. I think that this whole conference has focused on that and come back to that central point a number of times.

That we thought perhaps was a legislative issue in that the initial planning work that should have been done between probably the funders and the implementers of the project apparently had never gotten done. It doesn't seem from our discussions at least to be unique to that particular project. We discussed the fact that this can happen, not only in the funding of telecommunications projects but with roads and other public facilities and services.

Just received a handout regarding the Native communications group and it was suggested that perhaps, we as a small group, and in fact this group as a whole, perhaps endorse what these people are doing. Here we solved another problem but let me just bore you by reading a mission statement from the Native communications group first: To provide leadership, to create and promote a national agenda for Native communications. And since all of you can read I will let you read the rest of it yourself. The part of this that we dealt with in specific was a portion where they plan to train Natives in broadcasting. And we offered up the possibility of one of the problems associated with that is how do you recruit Natives for broadcasting? There are very few role models for Native broadcasters etc.

'The folks who were receiving this service in some cases didn't actually want it.'

It was suggested that through PSAs (public service announcements) on the RATNET, through PSAs on cable and by enabling these folks to produce those PSAs through KUAC that we could solve the first phase of that problem by identifying and recruiting these people. Everybody passed out phone numbers among themselves. We all agreed that we would attempt to assist them in doing that. If you need more information on this Diane Kaplan is probably the person who's still here that you might see and the person in your office, Diane, is Jaclyn Sallee who is heading this project up. And hopefully will be facilitating the training of those people that are recruited. Thank you.

McKAY: Thank you, John. The next group is the group that emphasized telephone communications.

GORDON PARKER: I was elected like you were, John. I think I was elected because I was the last one to come in the room. A little bit of a variation, I was not able to be here yesterday, my group wouldn't tell me what they discussed yesterday. That's not entirely true but I think our group was made up of people who are generally for the most part people involved in the delivery of some of the services that we've been hearing about here at this conference.

So our message may be just a little bit different. It concerns, I think, three things. One is the necessity of the business community and the education community and the other users to work together in terms of planning. It involves costs, it involves a system of regulation. Let me tell you a couple of real brief stories before I get into those that I think you need to keep in mind when you talk about the delivery of communication services in Alaska. One is, when the breakup of the Bell system occurred, and the FCC adopted all of its rules, there was very little mention of Alaska. And we kind of wondered about that and it has caused us some problems.

Some years after that happened I talked to an FCC commissioner. He said, "Gordon, we looked at your market structure. It's so different from all the other states, we didn't know what to do with it so we just ignored it and we hoped that sooner or later someone would come up with some ideas." So that's led us into a little bit of a different situation than the rest of the nation.

The other thing is, and this is very important, we have to talk about customer base. I was in Manhattan two or three years ago. I was driving down the street and a fellow said to me, "How many access lines do you have in the state of Alaska, customers basically?" "About a quarter of a million," I said. He looked over at the twin towers of the World Trade Center and said, "There's more access lines coming out of those two buildings than you have in your entire state." Well, that sort of puts our situation in perspective.

So when you talk about new technology, you've got to talk about some very careful planning and coordination between providers and users. One of the biggest problems industry has right now is trying to figure out, trying to do long-range planning, 5 – 10 years down the road, and arrive at a result that allows us to place our capital dollars where they ought to go. To make the investments that are going to provide the technologies that actually work, that actually are used by enough of a customer base to pay for them over a period that allows us to amortize that investment. So that is critical, we need an industry is probably a thought.

We come from an industry that our idea of marketing 25 years ago was, "Do you want the black phone this size or do you want the black phone this size?" So we need to do some changing ourselves. But it's very critical and I think you know one of the functions of conferences like this may be to allow us to find ways so that we can work together for this planning.

'There is a lot of designing around the technology in distance education, which I think is really unfortunate.'

On the cost issue, my friend Alex talks about his new technology. And this is great, Alex. I always like meeting because you always have something new like this going on. But these things cost money. A community, I believe, back in Pennsylvania that I heard about recently, had a major company that wanted to come in and put in a big factory. It's very important to a lot of jobs, not big jobs. But they needed an infrastructure, so they went to the phone company. They said, "We need you to do this for us." And the phone company sat down with them and they worked out commitments and agreements and they did it. They invested millions of dollars and they created a great situation. Two years later the company went broke and moved out. Somebody has to pay for the investment. So we've got to keep that in mind.

The third thing is a system of regulation. John mentioned the regulatory restraints; that's a very real issue for our industry. We're basically in an industry dealing with technology of the 1990s with a regulatory system that was implemented in 1934. All of us need to work together to allow the system of regulation to change as the industry changes and as the customer needs change. So I think those are the three points we were going to cover.

McKAY: Thank you. All right, now we will hear from the distance education group.

JASON OHLER: I ended up leading this group because I was told to. First of all, I think everybody in this room, most of the people have left so I guess I can say whatever I want. Most of the people in the group came to look at distance education as this really intricate tapestry and the minute you begin to pull on faculty development, you begin to pull on regulation or needs assessment, and so as I talk about one thing as opposed to another they're all related. I have a feeling as I get going on point number one I may cover the other seven anyway. So bear with me as that happens.

The first point that we came up with that needs to be addressed in distance education is faculty development and training. This brought up the whole design issue. This led inevitability to turf issues because what many of us saw happening is basically the association of personalities with particular kinds of technologies. Greg Moore is the IBG guy, Jason is the computer conferencing guy, Barry Willis is the audioconferencing guy and I think most of us would love to shed this and say we're basically educators; we've invested some time in particular technologies. You come to me and tell me what it is you want to do and I hope I have the wisdom to say you should use TV here and you should use computer conferencing in here and you should use IDG over here.

But there is a lot of designing around the technology in distance education, which I think is really unfortunate. People become interested in a particular technology and then they begin to go look for uses and audiences for it, and everybody in the group wanted to see that reversed.

Issue number two was evaluation and quality control. There is a great deal of concern. Barry Willis and I are particularly concerned. We're watching the mass production of education in distance education. This brings out the real cynical side in me but I think it's there because it makes money. Almost, period. I think we need to make sure that when we go into the design of distance education courses that we have a real tight evaluation process and all of us that were doing distance ed. that were in the group we noted that we can't possibly do the evaluation that we need to do without some sort of research assistance.

I simply can't teach all 100 people and keep generating all of the texts that they need and so on and do what I would call a quality evaluation. Sure, I can always send out a questionnaire that says on the basis of 1 to 5 did you like this week, what did you think was good and what did you think was bad? But I don't really think that's the kind of evaluation we need. We need something a little bit more detailed than that.

On the quality control end of things, it's very interesting that distance education has ended up escaping basically most curriculum committees. Because it doesn't go through generally academic departments. It gets basically shuttled over into continuing education quite often. They get to develop things however they want and out they go.

We had a situation on our campus in which there was an education course being offered and it was called Assertive Discipline. It was being offered through continuing education. Nobody consulted any of the education faculty and they all thought it was a horrible course, or most people did. It was this firestorm of protest and it ended up with a lot of real bad feelings between continuing education and education. We began to discuss some ways in which we might improve some things and inevitably what came up was the fact that there is so much distance education and the right hand doesn't know what the left hand is doing.

We discussed the virtues and vices of the centralized versus decentralized approach. On the one hand nobody likes to be told what to do, on the other hand there's no doubt that if we were in more contact with one another we could all benefit each other. And we discussed the idea that, for example, in Indiana Intelenet had put together a service in which a number of different components of the community got together, they built themselves, or designed out of, in some cases designed out of existing telecommunication facilities and services basically one network and then business and government and education then all bought time on that service.

'The way telecommunications regulation is set up is not conducive to education.'

Wouldn't that be great if we could be that smart about it. Rather than everybody developing their own little corner and nobody knowing what the other person is doing and ending up when you sort of stand back and look at it ending up with a very inefficient design. Of course, the down side of that is you'll have some sort of controlling committee to oversee that and of course we're all innately afraid of that, especially if they're academic administrators. We discussed the idea perhaps of having that run by a nonprofit corporation.

Point number four was transmission costs and regulation. We're all educators. We keep bumping our heads on this thing called regulation. It's this big black hole that none of us understands. It sort of like the IRS, when they say you can't do it you just sort of take it on faith. And the fact is that we bumped our heads on regulation so much that it's something that just has to be addressed if we're going to make the whole telecommunications industry and the delivery of services cost effective and conducive to education, if that's what we want. In that sense I appeal to you more as parents than I appeal to you as colleagues because it's really going to be a cultural or social decision where we go to the powers that be and say, "Look, education is our priority. The way telecommunications regulation is set up is not conducive to education. We think it's time education and telecommunications and the FCC and whoever the players are, and we don't pretend to know who they all are, sat down and say how we do this."

There were some other specific things that we're talking about as sort of stopgaps. One of the parts of Kay Brown's bill is establishing an 800 number to the UACN, which will be extremely helpful. There's already state lines that go into a number of smaller communities in Alaska that are not used to peak capacity and how we might be able to marry that with some of the demands made of the UACN.

The next point was needs assessment and that sort of ties in with that the fact that we really do need to precede any distance education with some kind of needs assessments in making sure you're not a solution in search of a problem.

Six was turf issues. We spent a lot of time talking about turf issues because those of us in the university system know that while it's, people talk a good game in terms of working together, the fact of the matter is none us is incentivised to work together. Those of us on the different campuses know for a fact that when we talk about doing different things with different components of the university we're very rarely by our administrators encouraged to do that. So we sort of say to our administrators, "We think it's time you got together and explained to us how it is that you'd like us to work together and incentivise us to do that."

We also talked about determining cost effectiveness in distance education. When someone asks me, "Is this cost effective?" I generally say, "Compared to what?" You can if you're talking about bringing in a teacher to teach Japanese and you're talking about beaming in a teacher to teach Japanese, I suppose you can throw that on the spreadsheet and say, "Which is more expensive?" But when you're talking about doing things like adding electronic mail to a classroom, it's very, very difficult to talk in terms of cost effectiveness because what will happen is a teacher will spend $100 one month to go on line and say, "This has improved instruction dramatically," but the principal will say, "How?" and so, how is it you sort of quantify what some of the newer technologies do when they're not replacing something that wasn't there before? That's very difficult, and yet there's an obvious value to it.

The last thing is that we talked in terms of very specifically how or what we might do on our specific campuses. The latest idea is the establishment of an advisory council that has absolutely no power whatsoever, except the power of suggestion. What we're seeing on all of our campuses, we decided, was that there are a lot of people trying to reinvent the wheel. So when my chancellor called me in and said, "Look, I think we're being really inefficient in our planning here, what should we do?" I suggested that we pull together an advisory council that brings together those people that have expertise in various areas of the different technologies and the different aspects of distance education, such as administration, pedagogy, support services, so on and so forth. And when somebody on your campus or in your school district wants to create a distance ed. course they go to that advisory council, they don't even have to, it's not a mandatory thing. But it's just really unfortunate, we all observed, how many people have to re-learn what I've just spent six years learning.

If we can do that on a campus basis, maybe someday we can do it on a inter-campus basis. And so when someone comes and says, "I want to present/deliver this kind of thing at a distance," and maybe I can say, "I think computer conferencing might help you here but it wouldn't work here," and the TV person says, "Well, why don't you use TV for this portion," and so on and so forth. So that's what we concluded.

McKAY: Thank you, Jason. The last group that we'll hear from is the group that dealt with technologies and communications. Davis Foulger will report to us on that.

DAVIS FOULGER: We had the disadvantage I think of having the group title that had the least direction associated with it. Technology and communication leaves a lot of latitude in terms of what you are going to discuss. So we spent about the first 45 minutes just deciding what it was that we probably ought to be discussing.

When all was said and done we came up with five questions that we thought would be interesting to explore and decided to explore them in approximately the order that I'm going to read. That is what we would like to see, what's out there and likely to be out there, and what's actually possible, what should we be doing now both in terms of new technologies and iterations of what we already have, and what we should be looking to do in 5, 10 or 20 years.

Having put together a wonderful agenda for the next "n" hours of discussion we managed to get through the first point with a little mix in of the other stuff inevitably.

Just in terms of some of the general philosophy that seemed to pervade the discussion all through, I think there is a general feeling in the group that leading edge technology is often cheaper than sticking with things. The market seems to turn over every two years and a lot of leading edge stuff becomes outdated rapidly. On the other side, that's not a universal and a lot of outdated technology is still very useful.

To lay that out on both sides: As an example on the one side, one of the folks in the room talked about some terminals he has in his company that are 10 years old and of use to no one, except perhaps the landfill. On the other hand, there are copious examples in the literature of folks doing things like computer conferencing, where, yeah, a lot of the people who were doing the conferencing came in on IBM PCs and Macintoshes, and advanced UNIX work stations and all of that, but in fact the guy who is writing the article and story running the conference was actually using the Commodore 64 the whole time. So the Commodore 64 continues to be quite useful, despite the fact that it's 12-year-old technology.

> **'Another big thing that was brought up was the need for products that evolve.'**

The point is that in computing a lot of times things remain useful. You have to be careful not to throw away too much. And finally, and importantly, technology should filter readily out to rural areas and a lot of that was apparent in the things the folks were discussing.

What was really important in what we said was that the further we got into the discussion the more we discovered that what we would like to see was stuff that was already being worked on and in the pipe in some sense. So in terms of things we would like to see, obviously not everything is quite that universal. The first thing that came up when I said, "Well, what we would like to see?" a rep. from the newspaper said, "Well, unlimited bandwidth totally free of charge."

Of course, the guy from Alascom laughed and we all started to get real. But the fact of the matter is that unlimited bandwidth totally free of charge probably is something that would be very useful to all of us especially in the kind of rural applications that we would all like to see. Clearly that's more a pipe dream than we'd like in Alaska where the kind of unlimited bandwidth that you get with say a fiber optic simply doesn't work real well when you can't dig in two inches in the summer time.

Other things though, 64 KB dialogue is a necessity. That's the general feeling all across the line. Beyond that we should be looking hard at getting fractional T1 service available in Alaska on a dial-up basis. It was noted by some of the folks who are more observant in last night's demo [a portable videoconferencing system was demonstrated to conference participants the previous evening] that while many of us who were listening might have thought that they had dialed two telephone numbers, and were using two 56 KB lines, because that certainly was what we were led to think by the discussion, they were actually using the dedicated 112 to Houston and probably a fractional T1 between Houston and Boston.

Another big thing that was brought up was the need for products that evolve. That is we've got a lot of the pieces. What's really needed in a lot of places with what's available in Alaska now is to evolve that stuff and make it better. Not so much to get new techology as to evolve what we have.

Things we'd like to see, a provision of newspaper services to rural areas on an immediate basis instead of on a one- or two- or three-day delay. It turns out work in that direction is well under way in terms of using electronics to make that kind of delivery happen.

More capacity to the Lower 48. A lot of folks feel that the capacity to the Lower 48 is severely limited at this time. They really need much better service. In fact, one thing that came up over and over again was the relative unreliability of 9600 lines between here and the Lower 48.

Provision of services to the public, in education, fire, police and emergency services.

Access to state data bases. Relative to this, there is a lot of concern about the cost of productivity and proprietary systems that we have in place and the need for standardized systems that cost manufacturers.

Another big thing that folks would like to see is, given the relative uniqueness of the Alaskan situation, the kind of leading edge technology and directions that have gone on here, that we'd like to see folks attempting to move into the manufacturing of technology here. It was felt that there are some clear areas where Alaska could lead, could continue to lead, in better ways and in fact wind up creating an industry in the electronics area. One area that was brought up was distributed data radio. This is an area where a lot of benefit could exist to Alaska in developing that kind of technology. Making it work here would result in an industry that probably would be exportable in other places. What would we like to see?

AUDIENCE MEMBER: Could you tell us what that means? What's distributed data radio?

FOULGER: Okay, there's a variety of technologies for doing data distribution on radio band. Clearly they fall into a couple of ranges and I use the generic term to cover them. But these things include things like CD packet radio and packet radio. Those are low-end technologies which some of the new bandwidth which is being freed up by the FCC could maybe turn into much bigger deals if people are thinking about them and developing them.

There are places in the Lower 48 where in effect you have radio LANs using these kinds of technologies. In effect, people are doing wireless LAN work on oftentimes CSMA, CD-type Ethernet technology. So that different systems can come on and communicate their stuff with other systems but using radio waves rather than coaxial bandwidth. There are obviously other examples of that kind of thing that will be moved on. This is an area where because of your highly distributed situation, you can potentially lead and perhaps result in manufacturable and salable technology.

Other areas where we would like to see things happening. Clearly videoconferencing, the demos were impressive to the group last night. Clearly the cost has fallen drastically and videoconferencing can be a giant cost savings especially where you have high travel costs.

Desktop interactive video. That's another direction, of course, relative to videoconferencing. Here the costs are much lower. Existing systems that are working. We see much of one just sitting over on the side here; in terms of a camera and a screen that's displaying. All we really need is the LAN going and we've got that kind of distributive capability. In fact, we have that kind of distributive capability at the place that I work and another place in England that we work with. In fact, using PS2's and relatively inexpensive cameras and a $2,000 plug-in card we're able to do interactive videoconferencing over the LAN. Now, we don't have a lot of offices set up to do that. Mine isn't one of them. But we do have an office on Long Island that is set up that way, and an office around the corner that's set up that way. So, we know that the technology is there and is working. The biggest problems are not the technology but the software to drive it. That's what's being worked on is the software to drive it. Clearly things like that though require random access dial-up, and the kind of demo that we saw right before we came in to hear the speakers.

Another area, electronic publishing. Making stories available immediately on-line without departure from the schedule for hard copying. This is the kind of thing that they use at the Anchorage paper; it's thinking about in terms of making its content available. If a news story happens in the middle of the night, the current thinking at the Anchorage paper is, why not just make it available at two in the morning? So let's dial at two in the morning, fine. If they don't get it until eight in the morning when the newspaper gets on their door, well, that's fine, too. Either way they have got the information that they need, and that kind of distribution can be readily brought to all sorts of rural areas if you are assuming the infrastructure is in place. It appears a lot of the infrastructure is in place for it.

Local area networks were brought up. There's concern about the incompatible formats in local area networks and the need for bridging and wide area networks to do that kind of bridging. Also, concerns about relative performance drops when you link remotely distributed LANs by T1. This is one area where my group back in Yorktown has a lot of experience because we are beginning to manage LANs on a widely distributed basis, not only in Yorktown but in Boca, in Zurich, Switzerland, and different places like that. We actually find that we get pretty good performance for most small data sizes over the T1 line. In fact, when we put a picture up from our telephone directory in Boca, it's not perceptually different in terms of the speed in which it comes up from the way it comes up in Yorktown where the pictures are stored. The broadcast time isn't as bad as the time that it takes to actually do the decompression and posting, and bring your window up and all of those things. In fact, you have sub-second response time in either location.

Finally, we talked a little bit about enhanced telephone services. There's a lot of concern about caller ID and blocking and those sorts of things. As we came out of that, there's also some concern about the fact that caller ID may be a fairly severe legal issue for the state of Alaska. That there may even be legislation in place that makes caller ID illegal. I referred the group to Kay, who I figured might know. But, needless to say we covered a lot of different ground. We kind of rambled a lot. We had a lot of fun talking and we hope that the stuff that we came up with is as enlightening to you as it was to us.

McKAY: Thank you, Davis.

Participants

Rosemarie Alexander
University of Alaska Anchorage

Robert Allison
Rock Association

Mike Anderson
FCC

Susan Armstrong
PTI Communications

Brian Biesanz
Department of Administration

H.A. "Red" Boucher
Anchorage Assemblyman

Jerry Brigham
University of Alaska Fairbanks

Kay Brown
State Representative

John Cameron
Department of Administration

Michelle Corder
University of Hawaii

Ed Cushing
PTI Communications

Chris Devlin
University of Alaska Fairbanks

Herbert Dordick
Temple University

Richard Dowling
GCI

David El'Mamuwaldi
Anchorage Telephone Utility

Sherry Emery
Congressional Office of
Technology Assessment

Tom Ervin
Alaska Power & Telephone

Sylvia Fink
University of Alaska Anchorage

Mark Foster
Alaska Public Utilities Commission

Davis Foulger
IBM

Louise Fowler
University of Alaska Anchorage

Doug Franklin
University of Alaska Anchorage

Len Frazier
Anchorage Daily News

Roger A. Funk
Alascom

Deborah Gazaway
Department of Administration

James E. Gore
Alascom

Dean Gottehrer
State Ombudsman's Office

Jean Graves
Alaska Yukon Library

Barbara Gruenstein
Alascom

Julianna Guy
Northern Television

Steve Hamlen
United Utilities

Jim Harpring
Department of Military and
Veterans Affairs

R.J. Hayes
Matanuska Telephone Association

Willie Hensley
NANA Development Corp

Michael R. Herbison
University of Alaska Southeast

Elizabeth Hickerson
Department of Law

Mike Hidalgo
Pacific Rim Telecom

Augie Hiebert
Northern Television

Alex Hills
University of Alaska

Kay P. Horton
Alascom

Diane Kaplan
Alaska Public Radio Network

David Knight
Anchorage Telephone Utility

Bernie Knighton
Alascom

Jerome Komisar
University of Alaska

Ronald Langley
University of Alaska Anchorage

Ed Levine
Office of Financial Management,
State of Washington

Steve Lindbeck
Alaska Humanities Forum

Edie Lynch
University of Alaska Anchorage

Brian Maracle
Radio producer

George Marshall
University of Alaska Fairbanks

A.J. McClanahan
The Anchorage Times

John McKay
Attorney

Wayne Miller
University of Alaska Anchorage

Greg Moore
University of Alaska Fairbanks

Lloyd V. Morris
Alaska Telecom

John Morrone
Department of Administration

Linton Moustakis
GCI

Mick Mulcrone
University of Washington

Bernadette Murray
PTI Communications

Lawrence Nakata
Department of Administation

Jason Ohler
University of Alaska Southeast

Alys Orsborn
University of Alaska
Teleconferencing Network

David Paeth
Prime Cable of Alaska

Gordon Parker
Alaska Telephone Association

Larry Pearson
University of Alaska Anchorage

Cipriano Ramirez
Department of Administration

Bill Rasmussen
Alascom

Michael Ridge
Department of Administration

Michael W. Roberge
Alaska Cablevision

Jim Ruppert
Department of Administration

Helene Sagmoen
Nushagak Telephone Co-op

Jaclyn Sallee
Alaska Public Radio Network

Harriet Shaftel
University of Alaska Anchorage

Steven L. Smith
University of Alaska Fairbanks

Barbara Sokolov
University of Alaska Anchorage

Greg Stevens
Alaska Cablevision

James Sweeney
Yukon Kuskokwim Health Corp.

Ann Terry
Oregon Legislative Computing
Facility

Peg Tileston
InformAlaska

John Valensi
Department of Administration

Alice Walsh
KSKA

Maryanne Watson
United Utilities

Howard Weaver
Anchorage Daily News

Ralph Wesser
Department of Administration

Dick Westlund
GCI

Ed Wicher
Department of Health and
Social Services

Larry Wiget
Anchorage School District

Barry Willis
University of Alaska

Ann Terry, of the Oregon Legislative Computing Facility, and Ed Levine, a conference speaker, listen to one of the presentations.

For further information about the Chugach Conferences on the Future of Communication, contact the UAA Department of Journalism and Public Communications, 3211 Providence Drive, Anchorage, AK 99508. Phone is (907) 786-1037; FAX 786-6117; Electronic mail AFLLP@ALASKA.Bitnet.

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